

2004 NBII All-Nodes Meeting
Big Sky Resort and Conference Center
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Welcome and Introductions

Richard Jachowski

USGS Rocky Mountain Science Center and Northern Rockies Information Node (NRIN)

Welcome. The NBII has come a long way since the days of the National Biological Service (NBS). One purpose of the NBS was to make information about biological resources available, to find information that was in state and federal agencies, universities, museums, and so forth. Using the Internet to make that information available was one of the original concepts behind the NBS. The NBS has gone its way, but that concept still is valid.

Now it's good for us to get together periodically to review our purpose and share ideas.

Today we're honored to have Dennis Carlson with us. Dennis is the representative in the Bozeman field office of Senator Conrad Burns of Montana. Dennis has a background in radio and TV and was the news director of a Bozeman TV station. He's received several broadcast awards.

He'll be followed by Jeff Hagener. Jeff is the Director of Montana Fish, Wildlife, and Parks. His background is as a master administrator since 1995 with Montana's Department of Natural Resources and Conservation. Before that he had various positions working in natural resources. He has a long history of working on natural resources in the state of Montana.

Lisa Graumlich is the Executive Director of the Big Sky Institute. She has a distinguished career in environmental science and research. She is also a principal partner in NRIN.

Montana Congressional Welcome

Dennis Carlson from the Office of U.S. Sen. Conrad Burns

Thanks for inviting me here. I have a letter from the Senator that I'd like to read to you.

"Thank you for allowing me the chance to welcome each of you to Big Sky country, and thank you for your kind invitation to join your gathering. Unfortunately, I can't be with you today, but I'm aware of the work you're doing. Let me commend you on your vision, dedication, and the scope of your efforts. Your work has great potential applying high technology to real world problems. Two hundred years ago, Meriwether Lewis and

William Clark used the latest technology of their time to document the rewards of discovery. For two years ... up the mighty rivers, around the Great Falls, through the headwaters, on to the Columbia River, and finally to the Pacific Coast ... their journey chronicled the places, animals, and people they saw. Maps were drawn, samples were taken, and measurements were reported. The information they gathered influenced policy decisions and guided other settlers and explorers, helping to define what we call today the Inter-Mountain West. Inspired by a spirit of adventure and motivated by a thirst for knowledge, the corps of discovery charted a future then as they recorded the past we read about today. Today the Northern Rockies Information Node is charting our future by bringing together information we know from many different sources in order to guide our steps into the future. Who knows what you'll find? That is the excitement that drives discovery. Your work is government operating at the speed of light. As information technology becomes faster and more powerful, those of us who make policy must be able to keep up. The NBII will help us do just that. Thank you all for your work, and I look forward to hearing about the results of this gathering. Please keep my office informed of the progress you make in the next few months and years. Sincerely, Conrad Burns, your Senator."

Thanks again for your invitation.

Northern Rockies Information Node Showcase

Jeff Hagener

Director, Montana Fish, Wildlife, and Parks

I want to thank Dick and Dennis for their introduction to this great state and this conference. I welcome you as well to Big Sky Country. Senator Burns has been extremely helpful with projects such as this for our state. He sits as the Chairman of the Subcommittee for Interior Appropriations. That's been very important for several things we've done in Montana, particularly regarding fish and wildlife species. We're very appreciative of the assistance he's given us.

I want to give you a little more background about this great state. This conference is in a beautiful Montana location. Year-round, southwest Montana is a destination for hundreds of thousands of visitors. But this state is greater than just this area, of course. You're only seeing a small part of the diversity this state has to offer. That's what's extremely important to me in my job and for my staff of natural resource managers in this state.

Montana stretches for over 600 miles east to west, and over 400 miles north to south. We sit at the headwaters of two major river systems: the Missouri River flows out from our east side and flows on down into the Mississippi and eventually the Gulf of Mexico. With the drought conditions we have throughout the West and Midwest, there's a tremendous interest in water. We, along with North and South Dakota, have some major reservoirs in the upstream end. We look at those reservoirs as major recreation sources

and for others who utilize that water. There's been a continual fight for several years about the release of that water to go on downstream to the downriver states. A lot has to do with industries down there, specifically barge traffic. Our interest has to do with recreation and native fishes and so forth.

On the west side of the state, we have the headwaters of the Clark Fork drainage, which flows on into the Columbia and on to the Pacific. On that side, it's a similar issue. We have the headwaters again in our state. We have bull trout that are a threatened species, as well as westslope cutthroat, that are very dependent on water levels maintained in the western parts of the state. Again, we have large reservoirs that drain into the system. But as we move further downstream, those of you from the West Coast know that salmon is the big issue. So we feel we get on the short side of things because salmon seems to become more important than the bull trout. They want the water from Montana to come and help with the salmon spawning runs; but by taking that water, we're jeopardizing our recovering bull trout and making it more difficult for westslope cutthroat. So water issues are a major issue in our state. Right now we have about an 8-year sustained drought making the situation worse.

Our habitats throughout the state vary from short grass prairies to sagebrush steppe on the eastern part of the state. We have a tremendous amount of that, as well as riparian wooded bottomlands through that area, but with a lot of open spaces with great expanses of native prairie species. Going to the western part of the state, where it's heavily timbered, and even glacial and arctic type tundra. The very highest levels are in Glacier National Park. We have a tremendous amount of variety in between.

Our annual precipitation also varies dramatically. In an area south of Billings it's about 4 inches per year, to somewhere around 45-50 inches per year in the northwestern part of the state. So you have a tremendous amount of variety throughout the state depending on elevation, snow levels, and so forth.

We talk a lot about what's normal in the state, but everything for the last 8 years has been well away from "normal." But what is "normal"? What effect does climate change have on habitat, species, and natural resources? The NBII deals with that kind of thing, too.

As far as wildlife species, again, we have a tremendous variety. In Montana and other states, the emphasis for many years has been on the game species. Sportsmen are very passionate about their opportunity to pursue those species. They want to have those species available for hunting and fishing. So over the years a lot of the other species were overlooked.

Over the last ten years, several of the programs – especially the States Wildlife Grants (SWG) program – have helped us broaden the focus on the whole cadre of species, everything that's out there. A lot of those species have benefited from the management of the game species. But we had species we didn't know anything about and weren't really considered as part of the mix.

We have species of special interest here in the Yellowstone Ecosystem and on into the Northern Continental Divide. We have two of the largest land carnivores out there – wolves and grizzly bears, which we believe are very healthy populations. We're working on the recovery of those species and, hopefully, de-listing so that they can go under full state management.

On the other end of it, we have the smallest of the voles and mice here. We have a variety of bats. We have nearly every migratory bird that migrates through North America -- from swans (the largest) to hummingbirds (the smallest). They all fly through here and some nest here. We have a wide variety of grouse. We have many songbirds that come from great distances.

On the fish side of it, we have many blue ribbon trout streams, and I hope some of you get a chance to enjoy these. We have many fish on the east side that are warm water native species. In some cases we have stocked species (walleye). But we have to understand the dynamics of the ecosystems we put those kinds of fish into. We're in the process now of trying to eliminate some species that were stocked by my agency as much as a 100 years ago that were found to be a detriment to the native species. Some of that is controversial because in some cases people have come to like the species that are there now.

We have some major large fish species. We have paddlefish in the Missouri and Yellowstone river drainages that can go up to 140 pounds. We have pallid sturgeon that are in the threatened status, and they may be moved to endangered in the near future, with perhaps as few as 20 mature adults still surviving. A lot of that has to do with dams and diversions along the river systems. Salmon, for instance, often can navigate such obstructions. But not warm water species that don't swim that fast or aren't nearly as agile. How can we get them around such barriers? This is something we're looking at.

We're extremely proud of all of our natural resources, but we can't manage those resources by ourselves. We're heavily dependent on partnerships with other state and federal agencies, with university systems, with private landowners, conservation groups, and the public. About 35 percent of the land in Montana is federal or state government owned. Part of that includes places like Glacier National Park and Yellowstone National Park as well as a tremendous amount of BLM and Forest Service land. About 7 percent is in tribal reservations. We're trying to work closely with them, too. As we all know, our fish and wildlife don't know anything about boundaries, so we need to work in partnerships.

One of our partnerships is with the Big Sky Institute and with the NBII Northern Rockies Information Node, particularly in the Yellowstone ecosystem. We have one person from our Bozeman office on the Big Sky Institute Steering Committee. We've collaborated on educational activities with Big Sky to try to educate the public. One of the things we think is critical to managing the species in this state for the long term is getting the public involved and knowledgeable. A lot of the comments we get come from out of state. We in Montana are required under the Montana Environmental Policy Act to go out for

public comment on anything we do that can have an impact on the environment. We regularly get comments from around the world on such things as wolves and bison and many other species. People have a great interest in this state and particularly the Yellowstone ecosystem.

We're also involved with the planning and development for facilities. Part of that is with the Big Sky Institute. When you go to Yellowstone, you'll notice the Porcupine Creek Wildlife Management Area that's just across the highway as you turn onto the highway when you leave Big Sky. That's a wildlife management area that was purchased many years ago for a winter range for elk that come from Yellowstone, as well as several other species in the area. We're looking at it in cooperation with Big Sky Institute in terms of many of the things they're doing with education.

Another partnership is with the USGS Rocky Mountain Science Center. It involves such things as grizzly bear monitoring. Grizzlies are currently listed as threatened throughout the state of Montana. One of the critical factors involved in de-listing grizzly bears is being able to document the number of animals that we have. Currently in the Yellowstone ecosystem the documentation has been very good because the research has been there for a greater length of time. When we move out of that area the challenge becomes greater. We have anecdotal evidence that grizzlies are in greater numbers in the broader Montana area than ever before. When bears are getting in trouble, we track and move them back into the wilderness ecosystems. But we need good documented numbers.

We're currently in the process of implementing a DNA study, which began several years ago in Glacier National Park. We were successful, with the assistance of funding from Senator Burns, to go with the USGS and Kate Kendall to expand that study to the whole Northern Continental Divide ecosystem. We have 180 people in the field putting out wire snares to attract bears to those areas so we can get an idea of numbers of bears in those ecosystems. It's a major project that's going to require several years of accumulation of data, moving toward de-listing them and managing them as a normal species.

A second effort with USGS and the Northern Rocky Mountain Center is participation in the Greater Yellowstone Area brucellosis committee. A lot of the interest in bison in this area revolves around brucellosis. About 50 percent of the bison in Yellowstone are infected with it. There's a major concern with the livestock industries throughout the border states – Idaho, Montana, and Wyoming. All of those states did have brucellosis free status. Wyoming has had some problems lately, related to elk they believe. But we're all trying to work together to deal with the brucellosis issue.

We're also involved in studies of grazing by livestock on vegetation on Fish, Wildlife & Parks land in particular. We also have to manage in conjunction with the private landowners around us. If we don't do that, we end up with major problems with game depredation. We don't want livestock owners to be losing a lot of vegetation because of elk or deer or whatever species are there. We're trying to work cooperatively to manage that.

Another area of interest is Chronic Wasting Disease. Montana has been lucky. We've only had one case, and that being in a commercial game farm. We set up surveillance around that site and we haven't had any evidence of it showing up outside that site. But in areas above our northern borders (Alberta and Saskatchewan), and in South Dakota and Wyoming, there have been cases in which wild ungulates have been found with it. We know of species in the northeastern part of our state that migrate 50-60 miles into Saskatchewan. So it's critical for us to keep track of what's going on. We're developing a Chronic Wasting Disease plan, in case it comes here. It's a very significant issue we need to look at.

I've also been exposed to the NBII through the International Association of Fish and Wildlife Agencies (IAFWA). I currently chair IAFWA's Science and Research Committee. We've had presentations and liaisons there with the NBII in the past, most recently in Spokane at the 2004 North American Fish and Wildlife Conference. Sally Benjamin, who was at that time the NBII-IAFWA liaison, talked about who the NBII was and how the states can make use of that. Currently the International has proposed \$6 million in grants for data management. We also have collaborative efforts between the International, NBII, and NatureServe to produce and manage the data that's out there. Within the Science and Research Committee, we've signed an agreement with the USGS that specifically is to fund the science and research liaison position and to develop workshops of priority science and research issues to be identified. The International just recently hired Russ Mason, currently with USDA-APHIS in Fort Collins, to be a staff liaison and do a lot of the coordination of issues with the NBII and others regarding state priorities in fish and wildlife management issues.

Through that IAFWA Science and Research Committee, we're establishing a process to work through the committee structure to identify priority research and science information needs of the membership and to share that information with federal partners to help guide future research and technical transfer efforts. I think we've all seen duplicative efforts going on. We haven't done a good job in sharing a lot of the information that's out there. So we're trying to centralize that information, put together workshops, and work with the NBII and NatureServe to put that information in a data source that's available for people to use in managing natural resources. The new NBII-IAFWA liaison will help coordinate with Russ Mason, with all the states, and with the Science and Research Committee.

There are several actions that we and other states are taking with the NBII that can help move these things forward. First we want to identify issues and priorities. And we want to have an ongoing dialogue with the NBII. We want to participate in NBII action planning through the regional forums in 2004 and 2005. I don't think a lot of the states yet recognize the value of the NBII to them. States are always looking for more data resources.

Several collaborative projects are currently underway between state agencies and the NBII that include assistance with tools, partnering, staffing, and standards:

- Sage Grouse Data Management Project – Sage grouse are very significant in Montana and a good part of the West. A technician that's directly funded by the NBII and International is playing an important role here. We see that as a critical component since the USFWS is currently considering petitions to list sage grouse through the West. A big part of this will depend on this technician's putting together relevant information
- Data Management Summit – Will be jointly hosted by the OFWIM, NBII, and IAFWA.
- We're working together to put together regional Migratory Bird Atlases.
- CWD data standards development will play an important role in dealing with the disease, which I mentioned earlier.
- Metadata training and assistance with state data sets and projects.

The state side of it sees the NBII to be of use to us and other state agencies where it can be developed to provide access to regional biological information; partner on data management; help in the development and sharing of metadata; provide access to tools, techniques, and associated experience; and leverage resources to meet state needs. In particular, the Northern Rockies Information Node can assist the Montana Comprehensive Fish and Wildlife Planning efforts by contributing to what we're doing in our overall Natural Heritage Program, data sets, and so forth.

I was a little naïve when I came into this position in not realizing how cherished these resources are. It goes far beyond sportsmen. Many folks from all backgrounds are passionate about these wild things.

The NBII is the tool that can bring together all of the information from federal entities, states, universities, NGO's, and others to help us manage lands and resources, not just in Montana, but throughout the nation.

Thanks for giving me the opportunity to speak to you this morning. I hope you have a great conference and will come back to Montana often!

Northern Rockies Information Node Showcase (cont'd)

Lisa Graumlich

Director, Big Sky Institute

We're pleased to be able to host you in Montana and Big Sky. I'm the Director of the Big Sky Institute (BSI). BSI is an initiative of Montana State University that seeks to enhance the scientific literacy of all sectors of the public. Learning more about the science of the Greater Yellowstone ecosystem is the one of our driving tools. Our relationship with the NBII and the USGS Northern Rocky Mountain Science Center is particularly important to that endeavor in a couple of ways.

The BSI relationship is probably parallel to partnerships that others of you have with academic institutes. That has enabled us to work together in three areas: looking at a general context for our work (challenges of being scientists and data managers in the 21st century), developing content together (example related risks and hazards and vulnerability to drought), and seeking new ways to do collaboration.

The first Director of the Big Sky Institute was inspired by the thinking of Carl Sagan, who said, “We remain a global civilization in which the most crucial elements depend on science and technology. We’ve also arranged things so that almost no one understands science and technology. This is a prescription for disaster ...”

In short, there are large issues about scientific literacy that not only affect resource managers but all of us dealing with these issues. Most of you remember what the environmental sciences were like in the 1970s. Things were quite different. Growing up on the shores of Lake Erie, I remember it as the largest dying body of water in the world. Today there are great recreational opportunities on Lake Erie. Clean air and clean water legislation in the 1970s and 1980s fixed the problem. When I talk to my policy friends, they say that those problems were “amendable to interventions.”

Today, environmental science looks somewhat different. It’s not just that it’s more complicated and everything is connected to everything else. Today we look at systems that can change in surprising ways either due to our intervention – or even our lack of intervention. We’ve reached new levels of complexity. Now we talk about multiple agents. Instead of one sector of society being the problem, we talk about numbers of different groups as instituting factors causing environmental changes. Now we know we often have to look at our own behavior and lifestyle and resource use as part of the issue.

We’re also looking at trade-offs. When we look at the issue of brucellosis on the edge of Yellowstone National Park, we see the trade-offs between having free roaming bison and the brucellosis-free status of our state. Once again, today the issues are no longer simple with a single solution.

In the 1970s we were really good at collecting information about single species. When we looked at *Ecology*, the flagship journal of our field, and tallied the spatial scope of a paper published there, the average size was the size of two tennis courts. Our scope was limited biologically and spatially. Our tools were also somewhat primitive.

Today, for instance, I have USGS colleagues such as Kate Kendall who are trying to count the number of grizzly bears in a 7.25 million acre area – roughly the size of Maryland and Delaware combined. This involves a strong collaborative effort between scientists at USGS, Montana Fish and Wildlife and Park, and Glacier National Park. Equally important, scientists and leaders of the Blackfoot nation and others. Kate uses the aircraft shown here to capture grizzly bears that then are subjected to DNA analysis. It’s a way of looking at a critical issue, trying to assess the status of this species in respect to the Endangered Species Act. Here we see very modern technology and a very large spatial extent. This allows us to address issues using 21st century science.

I also want to say a little about “where you are.” Jeff has described this biologically and in terms of the Greater Yellowstone ecosystem, which consists of about 15 million hectares, public and private lands, three different states and 20 different counties with about 350,000 people. Also about 350,000 grazing ungulates. So the number of elk, deer, etc. is about the same as the number of people. The area is also known for its nature-based tourism.

Another aspect of this: in the winter, we have about 4,000 people skiing daily at Big Sky. These folks and those with homes here pose a strong challenge to the management of this ecosystem.

The Crown of the Continent ecosystem sits on the U.S.-Canadian border. It includes Glacier National Park as well as Waterton Lakes National Park in Canada -- again, a very large ecosystem consisting of public and private lands. “Crown of the Continent” was named in 1901 in recognition of this area that provides a triple divide: waters flowing from that area flow into the Atlantic, the Pacific, and Hudson’s Bay. Also famous for the glaciers of Glacier National Park. Area is rich with wildness and issues of human-nature interaction. Provides a wealth of areas for people like myself and other scientists to collaborate on sets of issues. We’re also concerned how this area’s risks and hazards create vulnerabilities to human life as well as ecosystems.

We have a couple of ways of approaching vulnerabilities of these very large ecosystems. One is looking at local perspectives and being concerned with drought. We’re still in a record drought despite recent rainfalls. The droughts are set up upstream by various sorts of patterns of Pacific sea surface temperatures. We can see how various factors can lock us into droughts that last 7 years and longer, due to the persistence of warm and cold anomalies in the Pacific sea surface temperatures. We want to know how this affects fire as well as other resources.

I want to look at the way we’ve collaborated with NBII scientists to look at the long-term status of glaciers in Glacier National Park. This research was important in the early years for the dedication of this land as a park. They are perhaps some of the most politicized glaciers in the world. We can see the greatly reduced size over the years of the Grinnell glacier, about the same time as the Kyoto Protocol Conference in which Al Gore was saying it’s not just this glacier but the alpine glaciers around the world that are the smoking gun of global warming.

How do we understand the retreat of this glacier and glaciers like it from their early 20th century positions, and how do we understand how global warming might interact with the local topography as well as some of these large-scale, synoptic climate patterns to create glacier dynamics? We’ve got tree ring records from the park that show a long-term deviation above and below the mean, with the 19th century above the mean and late 19th century early 20th century moisture deficit (summer moisture records). We can use the work of others to look at the winter precipitation patterns. We can see that the glacial retreat started in the early 20th century.

What do we know from the monitoring of these glaciers from research like this? First, we've got this coupling between the factors governing glacial accumulation and ablation that are governed by large-scale sea surface temperature anomalies. Being able to link to these temperatures offers us an opportunity to forecast changes (on a 6-18 month basis) going above and beyond the simple statement that climate appears to be warming. This is important to Montana and much of the other intermountain west because we use our mountains as natural water towers ... water for irrigation, drinking water, etc. Our ability to forecast and understand comes from studies such as this.

How do we collaborate with others to get this kind of scientific information to people who can use it? We have a long history of collaboration, especially with teachers and their professional development. This summer we're looking at EPA-developed curricula on climate change, wildlife, and wetlands and taking teachers on a field trip in which they see the sites and work with scientists who developed these data in such locations as Yellowstone National Park, Glacier National Park, and others.

We're particularly excited about a new direction we've been taking in the Greater Yellowstone ecosystem in collaboration with the NBII partners, Montana Fish and Wildlife and Parks, West Yellowstone Chamber of Commerce, the Big Sky Resort and others ... and that is to think about the small businesses that take tourists and visitors out into the Greater Yellowstone area not just as small businesses and entrepreneurs but also as what might be called informal educators. To what degree can we provide these folks (hunting guides, rafting guides, boating guides, wolf-watching guides) up-to-date, credible, and memorable information to not only do a better job now, but to encourage people to come back again? We're developing a Web portal that will have different types of specialized information oriented to the different guides' services. We want feedback from those guides driving our content and how it's delivered. Our poster has mock-ups of what this site is likely to look like.

In parting, are we going to say to Sagan's challenge that we are able to address issues of scientific and technological literacy in the 21st century? There are challenges associated with that. For instance, we know that ecosystems are complex. When we get into ecosystems with human interaction, it gets even more complex. When I was preparing this talk, I looked at *Teaming with Life*, one of the documents that played a crucial role in NBII development and it talked about "America's living capital." When we're talking about all of our technical issues associated with information issues, metadata, and so forth, we need to have this larger perspective. So we know that what we do today is not only essential to understanding this living capital, but making good use of it. I wish you well in your work today, and I look forward to working with you in the future!

Future Directions for the Northern Rockies Information Node

Richard Jackowski

USGS Rocky Mountain Science Center and Northern Rockies Information Node

I'd like to say something about the future of this node and share some of the experiences we've had in making this work over the last few years. I also want to present a few ideas on where we might need to go.

Several years ago, we put together a proposal on what a node covering this part of the country would be. For those who aren't familiar with the NBII, it's a network of information clusters found on the Internet. Each cluster has its own mission, including what are called the thematic nodes (such as birds, fisheries, etc.) and those that are geographically based (the regional nodes). We involved some stakeholders – primarily Montana State University (MSU) and USGS. The original emphasis was going to be on natural resources management. We were going to build something for three main types customers -- natural resource managers, educators (the Big Sky Institute connection is a natural), and the general public.

We also tried to determine the node's geographic coverage. One approach was to look at the geographic extent of natural attributes. The other approach was to think in terms of states, which is what we did, focusing on Montana and Wyoming. We also realized we couldn't do everything to populate the node with information. Three subjects or themes were selected: geospatial information/metadata for natural resource information in the Greater Yellowstone area (USGS had worked with MSU in its geographic information and analysis center to develop these data sets); trumpeter swans, a species of concern (our center was also processing these data sets with the U.S. Fish and Wildlife Service); and climate (a very important concern in this area for agricultural interests and natural resources).

We formed a steering committee at MSU to help us determine where we should be going. We are currently reviewing applications for a full time position to work on this node and Lisa and I will make the selection soon. Jen Pollock, the Node Manager, has been very helpful to us in making this work. Once the new person is on board, we will see much more activity for the node.

Another thing that's been developing is an emphasis on educators as a key audience. With the help of BSI, we have a vigorous program developing in this area, reaching out to educators to provide help on natural resource issues. The node, as it develops, will provide a portal for teachers.

As for where we're going, one of the most important things is finding partners who can help us get there. MSU and the education folks have been very important. State fish and game agencies are another promising area. The person the NBII has at the International Association of Fish and Wildlife Agencies should be important in building the connection between the nodes and the state agencies. Jeff Hagener spoke about this in his address. I've already spoken with Jeff and many of his counterparts in other states. The Strategic Plan of the NBII overall also provides guidance on the direction and scope of this node from a geographic standpoint; i.e., the states we will cover. Since many of the states in

this area have many natural resources issues in common, growing the node geographically looks feasible.

Creating a Mountain Prairie Information Node (as opposed to a Northern Rockies Information Node) feeds into this approach to expand our coverage into North and South Dakota, Kansas, and Nebraska as well as Montana and Wyoming. This will help us broaden our partnerships to include, for instance, the USGS Northern Prairie Science Center in North Dakota and its partners. An upcoming state partners workshop will help in this regard.

As many of you know, an effort is underway at the USGS to create a digital National Map. Help will be provided state by state to assemble the data. We're looking forward to linking our NBII work in biology into this map.

NBII Program Welcome

Gladys Cotter
NBII Program

Welcome to everyone! Many of you know we had our first All-Nodes Meeting in Houston, TX, home of the Central Southwest/Gulf Coast Information Node (CSWGCIN), and about 40 people attended. Since then we've been to Tennessee (Southern Appalachian Information Node [SAIN]), California (California Information Node [CAIN]), and Hawaii (Pacific Basin Information Node [PBIN]), and our partnerships have been growing all along the way as you can see reflected in the size and diversity of our participants today. Today, through outreach and education, more people than ever are learning about the NBII.

I want to thank the folks who organized this meeting. Special thanks to Dick Jachowski and Lisa Graumlich who've been instrumental in putting the meeting together. Jen Pollock (formerly "Gaines") has been crucial as well. Also, congratulations to Jen for just getting a \$500,000 grant from the Fire Science joint program for doing work with the NBII on fire science research data and information. That's a great accomplishment. She said she couldn't have done it without Greg Gollberg from the University of Idaho. Congratulations to the two of you.

We've already heard too that Jay Hestbeck is a new partner on the new Mountain Prairie Information Node. Welcome and congratulations. We're looking forward to the new cooperation there.

I wanted to highlight a couple of the general sessions:

- GAP Data – We talked in the past about how do we integrate the GAP data that are being collected across the country; how do we integrate that information into the NBII regional nodes. We'll discuss the GAP decision support system.
- Human Dimensions Issues – Will look at how social science can assist the NBII. We want to start integrating that type of data, also.

Based on feedback from last year, the Program Track will highlight themes. The issue is, how do we get these themes incorporated into the regions so we're all working together and building regional as well as national systems.

- Fisheries and Aquatic Resources Node – Doug Beard is heading this up. He has had several focus groups to develop a strategic plan. It's important to get more input at this meeting.
- Invasive Species Information Node – Annie Simpson is the lead. Many organizations are participating, including two especially strong partners: NASA (John Schnase is here from NASA) and the State Department (has provided significant funding for regional/Inter-American as well as global coordination on invasive species issues). There is a focus on early detection/rapid response systems, modeling, and forecasting. These are the kind of high-end capabilities we heard about in *Teaming with Life* in terms of what the next-generation NBII should focus on.
- Wildlife Disease Information Node – Vivian Nolan is the lead. This node got a \$250K increase in funding this year to focus on chronic wasting disease, a critical issue across the nation. We're also working on West Nile virus.
- Bird Conservation Node – Elizabeth Martin heads this node. There is a strong partnership with Patuxent Wildlife Research Center and state agencies. From the beginning, this node has produced products that the NBII gets lots of positive responses about. Elizabeth is also developing a strategic plan. We need your input to ensure it meets the needs of the community.

This track will also talk about the NBII Strategic Plan requested by Congress. Currently it's in the Department of the Interior going through the vetting process. It hasn't been approved for public release yet.

Integrated Taxonomic Information System – Mike Ruggiero heads this up. Mike will discuss this from an international perspective.

Tips and Strategies for Growing Your Node – Here I want to recognize Bonnie Carroll and Jack Hill, the co-leads for the NBII Coalition. They've done a tremendous job educating people about what the NBII is, including its potential.

In terms of our international activities, we have always collaborated and cooperated on international activities focused on biological information for a couple of reasons: (1) biological resources don't stop at national borders (e.g., migratory birds or invasive species) so it's critical to share data among countries; and (2) sharing technology. We don't want to spend our money inventing technological tools that another country has already developed, or is in the process of developing. We want to partner with those organizations.

The NBII is the U.S. node to the Global Biodiversity Information Facility (GBIF). Any questions on that should go to the NBII's Mike Frame or Ed Murphy of the National Science Foundation, who is also at this meeting and is the head of the U.S. delegation to GBIF.

We've been helping build the Inter-American Biodiversity Information Network (IABIN) for a number of years. IABIN has received funding from such organizations as the World Bank, the Organization of American States (OAS), and the State Department. Doug Graham from the World Bank and Richard Huber from the OAS are also here. Our thanks to both of you!

Some of you also participated in a review by some leading scientists to see if a World Data Center for Biodiversity and Ecology should be included in the World Data Center (WDC) system. That group recommended this be done. Jack Hill is the director of that activity. There will be discussions at this meeting about the WDC and how we can incorporate NBII activities into that.

The technical tracks will address such areas as content development, Web development, the NBII portal, and geographic information systems. We encourage everyone to get involved in these working groups. Again, this is an area where we're trying to accomplish a couple of things: (1) getting standards that the community endorses; (2) sharing technology when it makes sense. Let us know if your organization is already working on some of these things. If so, maybe we can offer some funding to accelerate progress. Or we could adopt it if you're far enough along.

We're here to serve our customer base. As Lisa said this morning, we're building a technical infrastructure that's content rich. But what we're really trying to do is to provide information and tools that can be used to improve the management and use of our natural resources, as PCAST pointed out.

I want to mention some "collaborative focal points," people you can contact if you have interests related to their areas of concentration:

- Bob Worrest, who is here, is on a 3-year assignment from Columbia University to the NBII National Program Office. His main focus will be developing interagency partnerships. Bob will be reaching out to others, including federal agencies, who aren't yet involved in the NBII.
- Eric Schwaab is with the International Association of Fish and Wildlife Agencies. Eric is filling in while we are hiring someone to replace Sally Benjamin. He is the one here to see if you want to discuss states in the bigger picture.
- Judy Soule is with NatureServe, the NBII liaison to that organization. She will work to identify synergies we can build on and to ensure that we help each other along and don't develop duplicative systems.
- Dorothy Gibb is here and our liaison to the Department of Defense (DOD). Many people in this room have issues related to military land or other DOD issues.

I also want to mention that we have two new regional nodes starting this year – Mid-Atlantic and Northeast Information nodes. Plus, the Southern Appalachian Information Node is growing this year, so congratulations to them!

Bird Conservation Focus Session

Elizabeth Martin

The session started with a brief overview presented by the Node Manager of the Bird Conservation Node on the node's mission, activities and collaborators, followed by introductory remarks from the session facilitator. The Bird Conservation Node team, composed of Bruce Peterjohn, Mark Wimer, Mary Hamlin, and Elizabeth Martin, solicited input from session participants on the following topics:

Users and their Data Needs

- One of the participants felt the node should be taking into consideration federal landowners such as the Department of Defense. These users need information on threatened and endangered species. They need to know about abundances of birds in particular areas. Other groups to consider as users are FERC and Corps of Engineers.
- One participant suggested keeping in mind U.S. Fish and Wildlife Service refuges. These users need to know where their refuges sit in terms of migration pathways, relative numbers of birds coming through their area and whether those numbers are changing over time.
- State multi-species plans need to interface population with habitat data to decide where to plan for parks.
- One participant felt node activities should be focused on the general public and not the regulatory or land management agencies, since it is the public who is paying the bill. Some session participants disagreed with this statement.
- One participant suggested the node should think about the Public Health Community since birds are used as sentinels for diseases.
- One participant suggested that if land managers were going to be a targeted user group, they need information that is synthesized.

Information Activities

- Multiple USGS Science Centers have bird data. The node should provide a mechanism for accessing these dispersed resources. For example, should include molecular data which is used to track populations.
- The node needs to develop an intelligent Web site that helps the user find answers to their questions. That is, the node needs to help users define and refine their questions.

- The node needs to find out if users are finding what they came looking for. Perhaps including a survey that would help them frame their question would be useful.
- The node should use the expertise of information scientists and librarians, a group that has been helping users find what they need for a long time.
- In California, users are frequently requesting maps, which provide visualization of where a species lives. Node information activities should emphasize interpretation and visualization services.
- The node should provide authoritative lists, species identification tools, and standardization tools.
- Users want information from other people who aren't necessarily after data. They want knowledge and therefore need information beyond just a map. They need synthetic information or information coming from another person that is already interpreted. Some session participants questioned the latter part of this statement and asked whether this should be the role of the node. One of those participants suggested that perhaps a Help Desk would best meet this need.
- One participant pointed out that it was not interpretation but synthesis of data resources that was important. There is a need for data integration tools. In deciding what to do the node should consider its mission. In other words, is its mission bird conservation or is it data accessibility? The suggestion was to focus on making data available in an integrated way. Some session participants agreed with this statement as they felt that going into assessment and interpretation was beyond the scope of what a node should do.
- Some users felt decision-support tools would be appropriate.
- One participant noted that because the information needed by users is very specific and local, the node needs to provide something beyond raw data, but maybe not necessarily a complete synthesis. As an example, the Environmental Impact Statement and NEPA process was cited. However, some of the participants felt there is no need for the node to satisfy EIS assessments.
- For regulatory processes like NEPA, a participant stated that the kind of information that needs to be provided by the node is local information. This brought up the issue of the scale at which national thematic nodes should work. One participant suggested that the node should work at the national level, but that it also works with regional nodes to support more regional, state, and local data networks.
- One participant stated that the three core functions of a node are: (1) inventorying existing data sets (metadata), (2) establishing reliable data retrieval mechanisms, and (3) providing standardized mechanisms for users to download their data into their computers, and that these should constitute the priority activities of the node. It was

also noted that synthesis occurs at multiple levels. Some of the other session participants disagreed with this statement, as they felt nodes should help the user frame their questions.

- Another participant said the node should focus on facilitating the building of infrastructure; that is, help people not just to retrieve information, but also share information by providing a road map of how to develop and conduct monitoring surveys.
- Some of the participants felt that the NBII should be providing tools for data collectors to collect and document their data better.
- Participants mentioned that they would like to see the Bird Conservation Node develop or promote the use of standards for structuring and organizing bird information to make it more useable to the community. Regional nodes are looking for leadership from thematic nodes on ways in which we can all bring data together regardless of whether it is national or regional. Would like thematic nodes to provide guidance on how to better consolidate data. Examples of issues of interest to regional nodes are how to coordinate the exchange of species data, how to design databases, and how to measure quality of data. Need standards for distribution maps and confidence in those estimates of distribution.
- One participant concluded that given the array of different opinions on what kind of activities should be pursued by the node and the disagreement on what should or shouldn't be a node activity, perhaps the best solution would be to convene a broad guidance committee for the node that provides guidance on these issues.

Working Together

Participants were asked to provide examples of the kinds of bird data and expertise they had that could potentially be shared or integrated into the Bird Conservation Node and/or information they thought the node could provide that would be useful to them:

- Mountain Prairie Information Node – They have a trumpeter swan collared database right now and hope to get into modeling in the future. The USGS Northern Prairie Science Center conducts grassland bird work and has data from these efforts. The Montana Natural Heritage Program has harlequin data.
- Mid-Atlantic Information Node – Would like a one click access to Breeding Bird Atlas, Breeding Bird Survey, and other data sets for the state of Virginia. Region 4 of the U.S. Forest Service has all their point count data in a database. The node also has access to hexagon data sets from thirty states with predictive animal distribution. The regional node can provide contact information for access to these data resources.

- Southwest Information Node (SWIN) – The Southwest ReGAP project is nearing completion and they will have bird data. The sage grouse conservation management project is a project where there should be collaboration between SWIN and the Bird Conservation Node.
- Central Southwest/Gulf Coast Information Node – The USGS National Wetlands Research Center has information on the Mississippi Flyway. The Bird Node needs to contact them for additional information on this.
- California Information Node – Is hosting bird data for PRBO Conservation Science in California. Maintains MABFauna, which provides species lists for protected areas.
- Pacific Northwest Information Node – Has access to species lists for sub-basins and Oregon Breeding Bird Atlas data. There is an ongoing data collection effort by the USGS Forest and Rangeland Ecosystem Science Center on birds of prey of the Snake River, which is a management area with a major role from the Bureau of Land Management.
- Southern Appalachian Information Node (SAIN) – Is trying to develop a project with U.S. Fish and Wildlife Service on the Appalachian Mountains Bird Conservation Region. SAIN would like the Bird Conservation Node to be involved in this effort.
- Birds ID Guide has a list of 1,600 birds; resource can be found at <www.discoverlife.org>.
- The National Map is currently working on visualization techniques that could be applicable to some of the data and information provided by the node.
- The USGS Great Lakes Science Center has information on cormorants and disease spreading with hatchery-reared fish. The contact person there for this information is Jim Johnson.

Session participants provided ideas about potential ways to increase communication between the Bird Conservation Node and other NBII nodes:

- Send node strategic plan to all NBII nodes.
- Need to communicate on a way that is more than ad-hoc -- perhaps an annual meeting or quarterly teleconferences.
- Utilize the portal to disseminate what the node is doing or to enable other nodes to post questions and engage on greater discussion of issues. An example of a success story on use of the portal is the Global Invasive Species Information Node.
- Need to identify organizational structures to support communication.

- One of the best mechanisms for promoting communication is money. If funding is in place to do collaborative activities, communication will happen.
- Need to figure out distinctions between thematic and regional nodes. Confusion about roles of thematic and regional nodes is an obstacle for collaboration.
- Need to do a workshop or face-to-face group meeting to explore this issue of how to increase communications.
- Perhaps a pilot project would help the nodes figure out how we can better work together in terms of communication and distribution of information.

Future Guidance

Participants suggested the establishment of a guidance committee for the node:

- It was suggested that the Bird Conservation Node asks for nominations instead of volunteers for this guidance committee since the right committee will not self-select.
- Participants suggested that the node includes in its guidance committee an influential group of people outside our agencies and people who will defend us.
- It was recommended to have key people from the bird conservation community involved in the node's guidance committee.

Wednesday, June 23

Southeast GAP Data Products and Decision Support Systems

Alexa McKerrow and Steve Williams
North Carolina State University

Alexa McKerrow: I'm going to tackle this presentation with Steve Williams, my colleague. We want to talk to you about the Southeast Regional GAP Analysis Project. This is a three-year USGS-funded project, and we're at the end of year one. Collaborators on this project include the Biodiversity and Spatial Information Center where Steve and I work; the Alabama GAP Project, based in Auburn, AL; and the Natural Resources Spatial Analysis Laboratory at the University of Georgia. In addition we have cooperation with the EROS Data Center, the NBII, and NatureServe Ecology South, in Durham, NC.

We'll present a brief background on the Southeast GAP Analysis Project to discuss detailed landcover mapping; vertebrate species mapping by a demonstration of the GAP Ecosystem Data Explorer tool; and a brief summary of some data products and applications we're working with.

As a reminder: the GAP mission is to promote the conservation of biodiversity by making data sets available for the assessment of native species throughout their range. The overall Southeast GAP Project goals are to create seamless land cover products for the Southeast; seamless presence/absence models for over 600 native terrestrial vertebrate species; to incorporate GAP data with ongoing conservation planning efforts, for example, we're working with U.S. Fish and Wildlife Joint Ventures, the refuge system, as well as the state Comprehensive Wildlife Conservation plans.

The extent of the project is a nine-state area. We're mapping on a zone-by-zone basis, as opposed to state lines.

As many of you know, there was a state-based effort going on for several years prior to this. The advantages to regionalizing are a centralized technical process. We're working with EROS Data Center's data sets and also their process for land cover mapping. The BaSIC lab is providing the oversight of mapping, modeling, and database standards. We're taking the lessons we learned in the state-based map projects and providing a consistent emphasis on the thematic detail of the approach to mapping, both for landcover and vertebrate species modeling. Then we're working with NatureServe and they're providing further guidance.

I'd like to go into some detail on land cover mapping. For the regionwide land cover project, we have a general land cover classification; a detailed land cover classification, where we expect to have about 135 classes; an impervious surface and canopy closure estimation, as well as a library of digital photographs that we're applying and gathering as we speak.

The approach to the general land cover mapping is we're working within the EDC's protocol for that. We're using a classification system, their mapping zones, images that they're providing, as well as a decision-tree process. In fact, there are 16 cover classes in the Southeast being mapped.

The mapping zones in the Southeast: EDC has stratified the continental U.S into a series of mapping zones to provide for land cover mapping, as opposed to the political boundaries. We asked them to make the lines in the Southeast reflect our original lines because we felt that would be more appropriate at the GAP-level mapping stage.

This shows the three seasons of Landsat Imagery provided by EDC. In this case, it's the northern coastal plain of North and South Carolina and it includes eight Landsat images that fit together in each of the three seasons.

This National Land Cover data set is a standard database with lots of input players, including those images I mentioned and a series of ancillary data links. GAP's real contribution is the development of an extensive training data set; we're developing point data that has land cover labels on them. We're contributing the points as well as

additional ancillary data that helps refine the classifications as we interact with the Cart modeling process.

Southeast GAP contributions to the National Land Cover Data set 2001 are shown here. South Florida and Kentucky are being done by other collaborators with EDC at the general level. This shows two draft mapping zones currently existing. We have the northern coastal plain of North and South Carolina--that's in review at EDC currently. The east Gulf Coast of Mississippi and Alabama are in internal review.

Now I'd like to talk about the ancillary data development we're doing in support of this effort, as well as the invertebrate species modeling. There's the impervious surface and canopy closure estimation going on, the development of ecological landform units, national wetland inventory and population, as well as the development of the aerial photo library.

This is just a preliminary impervious surface estimation of the northern piedmont of North Carolina, with a blowout of the Greensboro area. Essentially this is just a scale of zero to one hundred percent that was developed through regression analysis.

The method for canopy closure estimations is a very similar one.

In addition, we're working on developing ecological land units in support of the GAP level mapping that we'll be undergoing soon.

Eighty-five percent of the National Wetland Inventory quads of the Southeast have been identified, and the 15 percent that haven't been are focused in Alabama and Mississippi. We're working with the U.S. Fish and Wildlife Service to scan and vectorize those missing quads to develop a binary coverage of wetlands and non-wetlands so we have a seamless coverage of that, at least for the Southeast.

Our aerial photo system includes a Hasselblad camera with a Kodak 645Pro Digital back; a Watson Inertial Measurement Unit; a global positioning system; a laser range finder that gives you an added measurement of the business at the photo center; and a digital video camera just as a backup.

This gives you two views of that camera set-up. All the components are listed. This is an example of a digital photo, and what this gives you is the context in the whole photo. If we fly and take a photo every ten seconds, that basically gives a continuous swath of photography.

To refine the concept of the ecological systems, NatureServe is working on developing a spatial range for these systems, based on their current descriptions. It's giving the GAP folks, primarily me, a feeling for what exactly does this system do, where is it on the ground, where are we looking for it, and how well are we capturing that.

As for modifiers to the system; for example, for the East Gulf Coastal Plain Near-Coast Pine Flatwoods, we'll be proposing that we recognize modifiers in the understories, such as oak. Then we also recognize offsite hardwood.

Those are the land cover mapping efforts we're doing while this multitude of applications that can be done with land came out. They're basically being done to feed the vertebrate species modeling. At this point I'd like to turn over the investigation to my colleague, Steve Williams.

Steve Williams: I'm going to give you a few steps that outline the model of vertebrates through GAP.

One is to establish the geographic known range.

Two, we assemble a database of habitat relationships, complete with the literature citations for all the species we're going to follow. Basically we're building a database to inform us of what the current status and understanding is for a particular species and its relationship to habitat.

Three, we obtain all the possible GIS coverages we can do our modeling with; we have to know what is available and what we can do with basic data layers. It's important to know what kind of ancillary data there is to work with.

Four, we develop a wildlife habitat relationship model for each of the species, directly tied to those available coverages we have.

Fifth, we revise the output maps, we have biological experts review them, then we refine them and process them. Hopefully we'll refine them to teach us more about what we know and don't know about species, and also further refine the models.

Re: taxa—we're doing basically the GAP standard, which is five of the last ten years breeding within a particular state or a consistent winter resident. And we're looking primarily at full species; occasionally we're doing subspecies when they're distinct and nonoverlapping. In the Southeast we have five species that were broken out into a variety of subspecies. We're including amphibians, mammals, reptiles, breeding birds, and wintering waterfowl. That brings us to a total of 581 species; if you add the 30 wintering waterfowl, it tips us a little bit over 600.

This slide gives you an outline of the kind of data we're dealing with from the states. With each of the states, with GAP the first time, the model was a round-robin approach to funding, and that is necessitated by the limited budget. It was over about a 15-year period. You can imagine the technology advancements in 15 years. Plus, you had very different techniques going on in various states -- different land covers; different states given the flexibility to customize their products, their legend, to the stakeholders within the state. Fifteen years ago, GIS really wasn't used much in natural resources, and that served a great purpose now, as you can see with the state conservation plans that have

come out for the wildlife program. But essentially the end product of that was that we ended up with very different data sets, so regionalizing the data is critical for GAP and is really a GAP strong point.

We're taking the best model that has gone on in some states and we're applying it throughout the region on a new and seamless land cover. The ancillary data, which is critical to a decent model of that we're developing—and this is a huge amount of effort—is hydrography, where we use the NHD data, and we break that into flowing, nonflowing, and wet veg, and then we apply buffers to that. Then we grid everything so that the models will run at a decent speed because we're looking at a huge area.

Then we have the land cover, which is a primary, but we also have derivatives from land cover, which include an edge match, forest interior; and then, finally, we add ecological regions.

So the products that we're coming out with: Year 1 is already finished, that was when just our lab was doing pilot projects to see how we would pull all this data together. And essentially we looked at 40 species; we wanted to get a handful of species out there so we could talk to people about "This is the kind of modeling we're going to do." And then we pushed through and did predictive habitat maps for those species as well.

We developed a database structure that would allow us to pull in all the different GAP data sets out there in all their various different formats and allow us to review it and compile it into a regional picture, basically summarize it. Then we developed draft lists of species and assigned them to the participating labs; those again are within the University of Georgia and at Auburn.

This map is a compiled land cover from previous state GAP land cover maps, all except for Alabama, which we did not have. And the legends, how they matched up, are very difficult. Essentially we end up with 56 classes, and we did our modeling on this land cover. This is with the 1992 data.

The result of one of those models is a very simple model here, prothonotary warbler. It's a decent model regionwide, and we can go in and apply other things later on when we get into the review state.

Year 2, which is the year we're actually finishing right now, we've gone through and have our final list of species, 581. We've gone through and developed polygon known ranges, and that was looking at data from the state products: field guides that were out there, reading up on the species, and then using various polygon and line data to help us define what those known ranges are.

And we've been working on the ancillary data that we're using for the modeling, and this will be an ongoing thing up to the day that we actually run the model. That's because NHD is continually updating from 1 to 100 to 1 to 24K data, and we want to get the best data available . . .

Two examples of those known ranges are the northern parula and the seepage salamander. Eventually we'll have a database that is a summary of all the information we gather; a textual description of the habitat, citations, and protection status; and the spatial modeling criteria that we used. Basically we don't want to provide, "Here's the answer"; we want to provide the data set that people can use and adapt. We'll have 600 predicted data distribution maps, and we'll do an analysis and report on biodiversity. Again, that's not the true final product; the final product is the data set.

We had a joint meeting last year with the USGS and the U.S. Fish and Wildlife Service, the National GAP meeting. We got to hear what Fish and Wildlife wanted to do. Basically, they want to get back into science and derive some numbers on the landscape so they can set their conservation goals. Specifically it's productivity, so they need models that go beyond what we do. And we feel like if they were to start from scratch and do that, that would be a horrific waste of effort. We've already done a lot of the ancillary data development and basically it's taking those models that we have up to a point, and then they push beyond that to try to get productivity and actually tie it to specific habitat types on the ground.

And essentially the way this is going to work out is, the prairie community for the most part has their act together more than any other taxa nationwide. And there are a number of continental plans that have come out. And essentially they summarize that into a national plan, and they divided the country up into these biological conservation regions. There are seven goals within these conservation units. This is appealing because these conservation units tie up closely to what our map units are—not directly, but they're a lot closer than state maps.

So essentially they want to get that GIS model in habitat productivity. Not of all species, just those priority bird species for given habitat types and that would be indicative of an assemblage of species of habitat types. They are specifically defining population targets in numbers and there are a lot of assumptions that go along with that, which have to clear the state about species density, productivity. And this is the kind of modeling that GAP typically doesn't do, because it does get out there on the limb of assumptions, and we keep our models traditionally Boolean, simple assumptions that have a broader application.

But the critical component of this is they have to monitor it, and they have the people on the ground to assess and improve the model all the time. They want to get at population goals; essentially they want to ask the question, "Where are high priority areas, and are they being protected and managed?" And a follow-up question is: "Is there suitable habitat sufficient for meeting population objectives?" They've done some examples in the West Gulf Coast.

This is a graph showing how this will tie together. We bring along the high-definition land cover and that will be the 2001 GAP land cover data set, the ancillary data sets we're developing along the way, and then the modeling experience we have that produced the

presence/absence model. And they bring along a lot of the biological expertise, and basically they want to push it further to get those productivity models and that's a matter of quantifying the habitat productivity, and that's either through expert opinion or through some statistical models, if the data is available for that. But along the way, again, they need clear, distinct assumptions and established monitoring.

How all this is pulled together is basically we're bringing along data, the joint venture is bringing along coordination among agencies — it's not just Fish and Wildlife, it's the all-regional players. Fish and Wildlife brings along their biological expertise, and then we see NBII coming in. Essentially we're reducing redundancy and being more efficient.

Thanks for your attention.

NBII Strategic Plan

John Mosesso
NBII Program

The NBII has been involved in developing a strategic plan for over a year. Here's an update on what's going on and what's in the plan. A year ago February we had a request from Congress for a lot of information on the NBII. One of the things they wanted was a strategic plan. They also wanted a vision for what we were going to do over the next couple of years and a timeline for those things. They wanted it all peer-reviewed by national experts who had no connection with the Program. They wanted to know about our accomplishments and how we were helping our users.

Pulling this together was a lot of work, but it was ready for delivery as scheduled in April 2003. Since then, things have slowed down drastically. There was an initial review of the report in May 2003, and then it was reviewed by the USGS, which took another month or so. The strategic plan went out for peer review last summer to some 18 individuals across the nation. Their responses came back and were incorporated into the report. Since then, the plan has been submitted to the Department for review. About two weeks ago we received comments back and we're hoping to meet with the Departmental reviewers next week. Hopefully, the entire package will go to Congress not too long after that.

Many people, such as node managers, have asked about this to help them develop their own strategic plan. So here's what's in the strategic plan.

It covers five years and tries to describe the purpose of the NBII and how it's important to individuals from research scientists to decision-makers who need a better understanding of the information we have with respect to our biological resources, penpal that can help them to make better decisions.

Here are the key parts of the vision of the NBII. This is intended to be fully digital system, interactive, user-friendly, on the Web, and we want to be sure to have reliable information for people to use. We also want to have tools to allow them to use it better.

In 1994, when the first concept of the NBII came around, and later with the President's Council of Advisers in Science and Technology (PCAST), everyone said, "We've got years of information that's been developed by researchers spending hundreds of millions of dollars annually, and we need a mechanism to make all of this information accessible and to make sense out of it. So, NBII, go and do that. As for tools, find a way to integrate data sets, with all of this aimed at better decision-making for anyone who wants biological information."

In putting the NBII together, we're working with established groups to determine priorities. These are the people we contacted, some of whom we consult regularly to make sure we're focusing on the right issues. We're working with many different kinds of cooperators across the nation who have high-quality information.

We also have information technology capabilities that help make the information usable. We want to help land managers be able to decide, for instance, where they should create a new refuge. This is tied closely to our work in the international arena. We have commitments to such groups as the Global Biodiversity Information Facility (GBIF), the Inter-American Biodiversity Information Network (IABIN), and others. As we develop our procedures, we're tying into groups like these so we're not duplicating work efforts. We also plan to have our U.S. data acceptable to people around the world and vice versa. To do this we are creating standards that are compatible with others and are developing means to protect intellectual property rights. The whole concept of the NBII is not to create a massive central database but to maintain the management responsibilities with the information/database developers; they develop, control it, and respond to questions.

In our strategic plan, we've described the key functions of a fully-functional node (to realize this for each node will take a lot more money than we have today). These functions are goals for each node.

- Data content – we want the key data sets that are important to a region or a theme. Who are the key players and what information do they have now that could best help the rest of the community?
- Data warehousing – So we can pull in data on any given topic from many sources. By taking a look at wildlife, for instance, across a large region, you can get a better sense of their status (as opposed to looking at one state).
- Data mining – Looking for trends in data. By searching across the network with researchers working in different parts of the country or the world, you can solve problems by looking at trends.
- Tools for synthesis and analysis -- Need to be able to take data from disparate sources and make sense of them. We also want to make it easier for people to interact with the NBII, learn about our tools and how they can get them and use them.
- Interoperability – We want to get preferred data to ensure compatibility

- Collaboration capability – The NBII portal is one way to define communities of like interests, so people can get together on specific topics and work together in a secure environment.
- Training and education – Need to make people understand that the NBII is there and how it can help them. We also need to have specific programs that are aimed at groups to teach them about biodiversity and what they can do with biodiversity information from the NBII.
- Create metadata to clarify and define everything that's there.

We have three different types of nodes: regional (focus on geographic areas with a particular set of issues and interested parties), thematic (look nationally at issues such as fisheries and aquatic resources or invasive species), and infrastructure (provide the information technology that pulls this all together).

The Program in terms of management: The National Program Office at USGS in Reston has a Steering Team of senior managers who deal with the day to day issues of what's going on, what's being done with their proposals, and so forth. Connected to them are the managers for each node. Node managers are constantly working with the Steering Team and also all of their partners.

We get our direction from: Bio-Eco organization in the Department of the Interior (this interagency organization looks at ecological issues across the federal government and makes recommendations to the NBII regarding focus in terms of key issues); and the NBII Science Committee (nationally recognized information management specialists and biologists who can look at the big picture about where the NBII is and where it's going).

Our next steps in NBII development: Nodes have been funded primarily through Congressional earmarks. This means uneven funding across the nation. SAIN, CSWGCIN, and PBIN are our nodes with the highest funding levels. We look to them for leadership in what the NBII is going to be. But our overall goal is to expand the network of regional nodes. We need to move across the country to create a nationwide system. But we can't forget the thematic approach. When cooperators tell us we need another theme developed we give that serious consideration. We already have some themes in mind, such as "botanical" and "natural history collections."

The key to success in the NBII is leveraging with our partners. We know this Program can't be funded exclusively at the federal level. We've been able to encourage our partners to give back to us in many different ways. Using a very conservative analysis, we've been able to determine that for every federal NBII dollar that's spent, we receive three dollars back from our partners.

Another area that was identified in the original examination of the need for the NBII is that we should focus on research in biological informatics. We've just begun in this area, but it is a very important element in our future. We hope to be able to move along at a greater rate as our funding increases.

We need to develop our ability to educate current and future NBII users. Too often we find out that people simply don't know who we are and what we have to offer. Happily, several of our nodes are already making progress in this area in projects reaching out to high schools, elementary schools, and others. These audiences are learning how to use the NBII as well as what equipment is used in natural resources science. Each node will gradually develop a capability in this area.

Another important area is responding to emergency needs as they arise. We don't know what's next. Five years ago, very few people were talking about chronic wasting disease. Two years ago it was a major issue in a number of states. State and federal officials came to us and admitted they didn't know who had what data, where it was, and so forth. We've dedicated a small amount of base money to this to create a node where information will be available nationwide and we're beginning to get support.

In summary, the NBII Strategic Plan is slowly developing with input from many bureau, Departmental, and other reviewers. We believe when completed it will serve as a blueprint for future program activities and growth toward its stated mission. Following formal approval and submission to Congress, the plan will be widely distributed.

Creative Ways to Grow and Promote Your Node

Jack Hill and Bonnie Carroll

NBII Coalition

ITIS and the Needs of the Nodes

Mike Ruggiero

ITIS Program

I'm going to update you on what ITIS is doing and show you some of the applications you might want to use at individual nodes.

These are the principal partners of ITIS, the ones that are putting in significant resources. Beyond this, we have lots of people who we call cooperators, but these people either put in money or resources. Resources in some cases are the assigned people to work with.

ITIS has been around for awhile under different names. Probably the earliest use of this concept was in 1972 with Chesapeake Bay. We started collecting a lot of species and they needed a code to build the nomenclature. That kind of morphed into the National Oceanic Native System. Then eventually the EPA started to partner with them and around the time of the National Biological Survey we went outside the aquatic realm and started breaking into different organizations.

We then partnered with Canada, Mexico came in, we started working with Species 2000, and now the latest accomplishment was in 2004 in which we want to use Species 2000, the latest Catalog of Life, as a standard for nomenclature.

Our original goal was to create a database for reliable information on species names and their hierarchical classification. Most of you already know the importance of names. They identify and protect in other contexts, index as to other things such as classifications and relationships among different entities. More recently, in the past few years, they act as connections on the Internet and other databases. We never anticipated this library community. If you do a Google search, you'll figure out who's using your database. A tremendous number of small university libraries and libraries across the country link into ITIS and use the classification system that we set out for their use. So, again, it's useful to scientists, researchers and data managers, and position and policy makers. Probably the initial target users were resource and data managers.

You have a lot of modifiers to the database in the U.S. Geological Survey. NOAA and EPA have these long-term data sets that needed to have new, correct names put on things. One of the more interesting applications that's been developed by NOAA is for shipboard use. As they run their trawlers they have ITIS in their hand-held devices so they can now assign the appropriate, correct scientific names to their collections.

We are in many places on the Web in four different languages: English, French, Spanish, and Portuguese. On our national Web site, you can choose a language. And internationally, with the Catalog of Life and our partnership with Species 2000, together, I believe, we're up to about 900,000 names. So we at ITIS contribute to that, as well as world databases.

[Mike demonstrates how to use the Web site.] People talk about GBIF; you get there and you can look up a name, and you browse. Right here is the authority, and then if you click up here it'll take you to the database. GBIF has chosen the Catalog of Life to use as their taxonomy. So it's either data from us or data from the U.S. Species 2000.

Here are some examples of what you can do with ITIS — finding a name, comparing lists, and linking to ITIS while creating a workbench. In this display, on the left side are the kingdoms. In the blue are groups that we're currently doing some work in or have some activity. You'll notice here where I've marked this species, we're thinking of expanding our kingdoms, just to conform with current thinking. We're looking a lot at working with microbes right now, but one of the problems is getting a classification people are happy with. There's a new sponge classification and we're working with that.

What I'm showing you here are the major groups. All of these other groups, for the most part, about 17 of them, have 150 species or less worldwide. But you have tremendous diversity here. The literature is hard to find for some of those things and some of the classifications have been through some changes. But that's where working with our partners at Species 2000 is going to help us.

We're working two tracks: one is the global track and Species 2000 and the Catalog of Life, and we're also working on North America's customers. This is where most of our funding comes from. The dark borders here [referring to the display] are kingdoms; if

you look at the green, those are where we have complete databases for North America. The yellow are groups where we're working. The purple are groups where we haven't done too much at this point. Our goal in three years is to have all our North American species completed. The Smithsonian has been interested in this; they feel the National Museum of Natural History should have a lot of information and develop an encyclopedia of life. ITIS is supposed to be an important part of that.

In terms of where we are in developing data, we're constantly increasing. We have more staff for the first time in a couple of years, so we've been able to generate a lot more data. What you see here in pink is the legacy data, and that all has to be sorted out. It's of variable quality, but it's something to work from.

I was at a conference a few years ago with another group, and several people got up and were showing Web site usage. It seemed whatever graph you had of whatever type, you had a dramatic increase in usage. I don't want to sound like everybody else, but this is really a phenomenon, with more Web use by everybody. So there are almost two million hits per month.

As for ITIS architecture, the architecture above the blue line is where we are now, which is mostly offline sufficient, getting data into the system. We do want to move with our next generation to give people the capability to enter data online, which moves data a lot more quickly into the system. Some of the examples of what you can do with ITIS: Most of the e-mail people want to look up a name. To look up "cactus," you go in and type it in and you list everything under cactus, then you pick the root of cactus down here. You will get the accepted name; the common names; the taxonomic status, in this case "accepted"; the "verified standards met," that's what we want, that's our quality indicator; and then the taxonomic hierarchy.

You'll also have the references that we used, the experts and so forth. Then you'll have the geographic information, whether or not it's native to the U.S., and the geographical distributions. We also have a link to Google so you can get some images. This was something I discussed with a classmate who was trying to get an accepted photo for every name they had. They told me they had a backlog of about 2,000 photos and were trying to get releases on them. One of our partners had us look to Google, so we decided we should do that and let people decide which ones they want to use. A lot of people have asked us for pictures and this is a big help.

Let me show you some of what you can do with this database because it uses the same database we use with other applications. So you take that species and put it into there, you get the same basic information. You can do a business search off of there. And then there's this "map-it" function, which will show you where these updates came from, and will cross-reference various collections. You can go in and pick up global dots and it will give you the longitude and the latitude and then it will actually take you to the specimen itself. This is kind of the model that has been adopted by GBIF.

For those of you interested in having your own workbench, a taxonomic workbench, you can download — this is kind of our input system, but it is also used if you want to develop a global species list, for instance. It's somewhat arcane to get through, but the people who have managed small collections have found this useful at small museums. As you can see, it has lots of fields here. It gives you the classifications, the vernaculars, synonyms, distributional information, publications ... these are all the things you can get. And actually, anytime you put a name into ITIS, it goes to all of these, and we have all this information that we add into the correct classification.

If you don't know the link directly from the name on your database into ITIS, you can go to the URL that's out there and it gives you all the instructions for linking directly from that name of your database into ITIS, and that will give you a dynamic link. Here's an example where you can access the Wildflower Center in Austin. The Lady Bird Johnson Wildflower Center has a list of all native species and what they've done is to use ITIS as a direct link to the taxonomic reporting. That way, they don't have to worry about keeping up the taxonomy; they can use us to do it.

We're moving on now to what you may see this afternoon. We're in the process of thinking ahead and we know many of the main issues we'll deal with. One is the speed at which we make corrections. Another one is, how do you deal with multiple classifications? We use a particular classification and link that to others and end up having to use professional databases for translating. Those are just some of the problems we're dealing with.

Thanks for your attention.

Thursday, June 24

Human Dimensions: How Social Science Can Assist the NBII

Dr. Berton Lee Lamb

USGS Fort Collins Science Center

Thank you very much for inviting me to speak today about the NBII and the connection to social science, also sometimes called human dimensions.

I'd like to thank Julie Prior-Magee, and I have something special to say to her. Nathaniel Pryor was a member of the Lewis and Clark expedition. He was one of the nine married men on the expedition. He traveled with Lewis and Clark and returned with them. He later attempted to return the famous Mandan chief to his people to repatriate him, but he and his party were stopped and he was not allowed to do so.

Later he rose to the rank of captain in the United States Army and served in the War of 1812 under Andrew Jackson in the Battle of New Orleans. I guess his first wife must have died because he married a Native American woman in Arkansas and they had seven children. He's buried in Oklahoma. He spells his name Pryor.

He kept a journal, but the journal has never been found. They think the reason it was not found is because it was lost while in trans-Atlantic transport to France to be published. He did not keep a copy. He did not back up his data.

That's what I'm talking about today — how we're going to have the data that we've been collecting as social scientists available for decision-makers in some sort of centralized, easy-to-access form. I'm sure that if Nathaniel Pryor had had a chance to go down to Kinko's and make a copy of his journal he would have done it. But he didn't.

What I'm going to talk to you about is how a group of social scientists from different institutions have gotten together and started to have a conversation about how we would collect the information about human dimensions of natural resources and biological resource management in a way that natural resource managers can have access to it.

The funding for my program comes from the USGS's Status and Trends program in the Biological Resources Discipline. Consequently, what I want to do is look at the status and trends of the human dimensions — social, demographic, economic factors affecting the nation's wildlife management. What the partners are interested in is providing increased access to data and information about human dimensions.

There are some things we'd like to collect data about and share data about — you can read about those (referring to display). In the USGS there are two groups of social scientists: one at Menlo Park. At the Fort Collins Science Center, there are just about a dozen social scientists: sociologists, political scientists, human dimensions of wildlife, and economists. That's the bulk of research capability for social science in the USGS. Here are some of the things we're looking at.

We don't do demographic trends too much at the Fort Collins Science Center, but we're looking at the incessant visitation patterns on public lands. But there are other things that ought to be collected — actually that are being collected and ought to be a part of the NBII. Those are: what's happening with urban sprawl, likely trends in ethnic diversity among the human population, migration patterns. There ought to be a way for natural resources managers to come to grips with that.

At the Fort Collins Science Center currently we're doing some research on underrepresented minority visitation at parks, refuges, and other places. That's an interesting question: trying to find out what underrepresented minorities want to do and learn about, what they want the visitation experience to be about.

We're also looking at information about people's knowledge of the environment. There are many surveys about this: What do people know? Where do they learn the information? Who do they trust to provide them with information? We've done a regional survey about people's knowledge about and attitudes toward black-tailed prairie dogs, and I'll share that with you. First take out a blank piece of paper--we're going to do some social science research here. Draw this table on there; it's four columns wide and eleven rows. Across the top, write "Terms," "Know the meaning," "Heard of, but don't know the meaning," and "Not heard of." Down the lefthand column, write these terms: "water

right,” “diurnal,” “hydroelectric,” “recreation opportunity spectrum,” and so forth. Now I’d like you to put a checkmark in the box to indicate your knowledge of each term. Do you know the meaning of “water right”? Make sure all the things are filled out.

We did a study of the short-grass prairie regions of the prairie dogs. We did it in August and November of 2000 and when we do a study like that, we generally come up with a little table like this that will give you an indication of the response rate from these surveys. Most of what I’m going to talk to you today in terms of the data are surveys. We do a lot of other research besides surveys, but surveys fit the best as a model for thinking about what might go into the NBII. There’s other stuff, but this fits the best.

If you look at this, you’ll see that our response rate is consistently above 50 percent for all the parts of the study that we collected. And frankly, studies of this kind, if the response rate is below 50 percent, are not trustworthy. Here are the terms we asked those people (referring to display). What can you see from this little data set? I think it’s interesting that they all know the meaning of the term “Endangered Species Act.” Lots of people know “urban sprawl,” “ecosystem,” then it starts to drop off. What’s equally interesting is that the new favorite words of biologists are completely unknown to the general public. More people say they know the meaning of “random demographic events” than know the meaning of “diurnal.”

Now we did a study and did another question for this and we asked people if they knew what time of day prairie dogs were active: Were they active during the day? During the night? Both? Almost everyone knew they were active during the day; they just don’t know the meaning of that word.

[Referring to a slide] These are the same terms, so you get the basic idea. But we not only asked the general public, but broke it down into the general public; people who are passively political, who had done things like attend meetings; and then people who are actively political, such as people who wrote their congressmen or did other active things like that. You can see that, relatively speaking, they all knew “burrowing,” they all knew the Native Species Act. Even the most active people knew these terms.

We’re not the only people conducting studies like this [referring to slide]. In these other studies, and we just repeated this, they said that what it looked like is that the knowledge of these technical terms falls into three knowledge domains: the scientific, the policy, and the public. Looking at these four studies [on slide], these are the way these terms fell out. I’d like you to reflect on the terms you know, and the terms that other people know, and where the terms that you know fall.

[Puts up a slide with a table.] It’s interesting to think of what we’re saying when we’re saying things to folks. How are we describing the world as we see it? What language are we using? What do they hear? We’re also doing work on stakeholder and public involvement. We’re doing two kinds of research at the Fort Collins Science Center — research on conflict resolution and training on conflict resolution. The conflict resolution knowledge needs to be associated with the NBII because managers of our public lands are involved in engaging the public in big planning efforts, and so they need to have this

kind of information. We report this sort of thing in the regular kind of literature; this is just an example of something we've written: "The Importance of Defining Technical Issues in Interagency Department Negotiations," which appeared in *Public Works Management & Policy*. You can get that on our Web page.

One of the important things we found out in doing this research, which is reported in this paper, is the role of science in environmental negotiations. You might say that scientific information will guide the decision. In a lot of the negotiations we've studied, the parties decide to do studies in order to figure out what the negotiation questions should be. This is a huge mistake. The parties should figure out what the negotiation questions should be and then design studies to answer them. What we discovered in our research is that the science frames the bargaining questions. It may not provide the answer, but it frames the question. So you want to be very careful what science you do, because you're actually framing the question.

We teach these courses that teach pearls of wisdom — again they're on the Web. We teach two or three of the basic negotiation courses each year and one of the advanced courses. We try to hold them all in Fort Collins because it's easier for us. We also look at public preferences. We'd like to do an annual national survey of citizens' preferences for environmental management and there are surveys done like this by some of the big polling firms: "Do you believe the environment is an important issue?" and questions like that. But we're more interested in looking at how people understand more detailed questions about environment management, so we can get at some of the nuances of people's preferences and beliefs. We do regional surveys — we saw one example on the prairie dog, and we do briefings for managers and report that. Currently we're looking at some national surveys, we're doing some regional surveys, and we're doing many, many land-unit-related surveys. You heard yesterday about CCPs; there are CCPs, there are resource management plans, there are forest management plans, there are park management plans — all of these require an assessment of public opinion about options and we're doing many such surveys.

Here's something from the prairie dog survey [referring to slide]: respondents' perceptions of the seriousness of the prairie dog problem. Sixty-nine percent of the people don't believe that fiddling with the prairie dogs is all that important. We did another regional study of the Colorado plateau — that's a 31-county study in four states — the response rate for that study was 53 percent. Just one finding that was kind of fun -- among residents of the Colorado plateau, 55 percent said they do one of these many things more than three times a year [referring to slide]. So people of the Colorado plateau are very active outdoors. How does that hold up for other regions of the country? The Colorado plateau is basically a non-urban area. What about people from urban areas? What about people from urban areas that are near national parks and things like that? Studies like that are done, the data are out there, but it's not centrally collected anywhere.

Now just because I'm commenting to the Greater Yellowstone area, I decided to throw in this little study [referring to slide]. We've got an 80 percent response rate, and we asked people who were camping. If you see a wolf one time, what would your experience be? Extremely cautious. Pretty cool, huh? What if you saw them several times? And if every

time you saw them your small children were running around in front of your tent? See, social science is not really bad and mean and nasty and ugly. It can be funny.

We did a survey this year for the Colorado Canyons National Conservation Area. The response rate was 66 percent. This was a survey of people who had been active in the planning process — people who had been going to the meetings and asking questions and sending in letters, and so forth. And that's what we call the "attentive public," and they gave these answers. "Visiting national conservation area"—Colorado Canyons is down by Grand Junction; it's real pretty, and it's right next to the Colorado National Monument. It's a national conservation area established by President Clinton. "Let me better understand the environment and history of the area"—that's pretty positive. "Allowed me to get away from a developed setting into a natural environment"—that's positive. You can see that of the people who used it, male and female, are about the same. You can also see the big challenge that's faced; only about 4 percent of local residents and only about 10 percent of nonresidents.

What's the trend across our public lands in terms of motorized use? I don't think it's up, if you collect all that from the various units that have studied that question, it's just that it's not really down.

How about fees? The Fort Collins Science Center conducted a national assessment of the fee demonstration program for the national wildlife refuges. We studied 64 refuges in different parts of the country, we looked at different types of fee collection, we looked at different types of refuges, we looked at different levels of fees. You might be surprised to learn that at some of the national wildlife refuges they have ATM-like machines, and you just put your thing in and you get your ticket and it's all automated. At other ones, they have GS3 federal employees at the gate, and at other ones they have no one, but they hope people will throw some money into a bottle or something. We looked at those different things.

This one looked at Colorado Canyons National Conservation Area and whether fees would affect visitation. One of the great questions about this is, if you start charging fees, under the Fee Demonstration Program, as I guess you all know, 80 percent of the fees collected can remain at the local land unit. This is extremely important because study after study has shown that people are more willing to pay fees if the fees stay at the local unit.

But one question is: would you continue to visit if you had to pay a fee? Another question is: where would you go if you didn't pay the fee? If you're displaced, where would you be displaced to? It's often thought that poor people are more displaced; the question is, are they mostly likely to come? What about underrepresented minorities? Are they coming or are they deterred by fees? All these questions have not been systematically asked and answered, but they need to be.

How about economic matters? We also looked at that. One of the things we do is regional economic assessments. We can, for example, say how many jobs, in what categories of jobs, will be lost or gained from a change in policy on a given land unit.

At the National Conservation Area near Grand Junction, we did estimates on how many people were coming. We used undergraduate students to gather information.

How about the total annual spending in Mesa County by nonresident visitors in places they went? The county's not going to tell you how many jobs three million dollars creates, but it's some. It's important for a place like Grand Junction.

We look at other values as well. How about people's use of their leisure time or their recreational activities? And then just looking at the published literature and trying to identify trends. We do background and literature reviews.

I have some closing slides, and they're really boring. So I'm going to dwell on them at length. The people at Oregon State University have been doing a number of these very large surveys looking at people's attitudes, knowledge, behavior, and preferences in terms of natural resources management. The social and economic values unit at Rocky Mountain National Park — these guys are primary actors and economic evaluators for our nation's natural resources. At the University of Texas-El Paso they're doing big-time work on the borderlands. And the conservation biology department at the Denver Zoo -- the fascinating thing about them is they're led by a social scientist, he's well known in the field, and of course he's in the district of Congresswoman DeGette. We got together in December, and we're working on developing informal communications protocol. I guess that'll be up and working one day pretty soon; we're in this for the long haul. I think as Mr. Hill said yesterday, this is important stuff, and we're in this for the long haul to get our natural resources managers served.

What we need from outside partners like you and the natural resources managers is more ideas about what is needed, what kind of data, information, and analysis we should be providing. Do we need to find some cash to focus on national surveys? Are these regional surveys okay? Can we roll out the site-specific surveys in a way that gives us facts and trends? We think we can do that; it's kind of clunky to do it that way, but we're trying to ask questions that are consistent between units so you can start to compare. You know that all these surveys require OMB approval. We're really good at it. We'll help you get approval.

And really, this whole thing we're working on now is basically reimbursably funded; it's little project by little project and we're trying to find a way to do that short-term research so we can serve needs better and get a database developed that managers can use and at least guide the work that they want to do on their own land use.

If you want to contact me, just get in touch by e-mail <lee_lamb@usgs.gov> or phone (970-226-9314).

Fisheries and Aquatic Resources Focus Session

Doug Beard

Fisheries and Aquatic Resources Node

Part 1.

The first part of the session focused on an overview of the process for developing the FAR strategic plan, the contents of the final strategic plan, and the projects underway to address specific priorities outlined in the plan.

FAR Node's Process for Developing a Strategic Plan

1. Formed guidance team of primary customers
 - still need representatives from the US Forest Service and Bureau of Land Management
2. Followed basic strategic plan development
 - begin by outlining a mission
 - identify the specific goals, objectives, and strategies
3. Held second meeting to outline success measures
 - meet annually to discuss accomplishments and FAR direction

Strategic Plan Outline

1. Definition of mission statement
2. Categorized the FAR world into 4 categories
 - a. diadromous
 - b. freshwater
 - c. marine
 - d. culture
3. Identified current management issues
 - a. integration
 - b. standards
 - c. effort
 - d. access
4. Based on all the above, the guidance team agreed upon 4 priorities
 - a. develop information systems that can be used to assess status and trends
 - two approaches
 - i. species specific
 - ii. regional – watershed basis
 - very similar to what is happening in aquatic GAP
 - cut country into major watersheds
 - where regional nodes will play a large role
 - b. act as a clearinghouse
 - c. promote the development of standards
 - start by collecting existing standards
 - later work with scientific societies as it is easier to get states on board if an outside group is heading the effort (rather than a federal agency)
 - d. continue partnership efforts

Projects and Relation to Strategic Plan

1. Information systems to assess status and trends
 - a. species specific projects

- i. sturgeon in North America – Michigan State lead
 - ii. eastern brook trout – Fish and Wildlife Service, Forest Service, SAIN, MAIN, states
 - hope to get multi-state conservation grant
 - could be pilot for National Fish Habitat Assessment Initiative (USFWS)
 - bring in Northeast Information Node
 - iii. American eels – AFS-Computer User Section
 - see what data is available for eels
 - iv. FishBase – FishBase, IABIN, Center for Ecology of the Venezuelan Institute of Scientific Investigations
- b. regional (watershed)
 - i. Lower Colorado – Kansas State, aquatic GAP, SWIN
 - ii. Puget Sound – USGS Western Fisheries Research Center, PNWIN, aquatic GAP
 - companion to current Great Lakes aquatic GAP
 - iii. Delaware River – Penn State, AFS-Computer User Section, NE Node, states
 - major effort will begin in winter
 - iv. Rio Grande – CSWGCIN, SWIN
- 2. Clearinghouse
 - a. one of the basic node activities – USGS Northern Appalachian Research Lab, Penn State
- 3. Standards
 - a. reporting standards for inland fisheries landings – UN-FAO, Mekong River Commission
- 4. Partnerships
 - a. FAR guidance team
 - b. FAR node manager

Comments

- FAR will address other species through projects where available, but the node focus is fish
- Ultimately, FAR wants data owners to maintain their own data and we will just access it
 - FAR will probably need to work with regional nodes to help with this

Part 2.

The second part of the focus session consisted of open discussions guided by the following five questions:

1. How can FAR and the regional nodes interact?
2. What are the mutual goals between regions and FAR?
3. What do you want from FAR?
4. How can you help FAR?
5. How do we integrate aquatic GAP into FAR?

The following summarizes the discussions:

- way the strategic plan is broken down (regions, species) is a good way for regional nodes to go to stakeholders and ask them for FAR-related needs/projects during their strategic planning process
 - may want FAR node guidance team members (preferably) or FAR node personnel to be part of the strategic planning process at the regional level
- what are the different mechanisms for communication between FAR and the regional nodes:
 - meetings, conference calls
 - portal
 - participate in guidance team meetings
 - COMMUNICATION is the KEY – The NBII has the foundation so we should be able to come up with something that will work
- goal for node proposals is to get them in around the same time frame
 - want node proposals to be in sync and have similar developmental processes
 - need FAR to have some sort of meeting or call for proposal announcement, identify deadlines, and get them out to regions so they are aware and pay attention
 - maybe nodes should formalize proposals prior to the annual All-Nodes Meeting where they would discuss them – then, after the annual meeting, nodes would finalize proposals and have them ready to submit
- watershed level information may differ by region, but all will contain species information so it should be usable across systems
- species indices still need to be addressed
 - aquatic GAP will look into IBI's and compatibility issues and help define metrics
- how do regional nodes interact on FAR issues – there is an overlap
 - should not be hard and fast boundaries – e.g., aquatic GAP analysis for the upper Tennessee watershed was conducted by MAIN but is being shipped to SAIN since it is a logical place to reside
 - there are two sides:
 - user – doesn't care about boundaries and shouldn't be aware any exist
 - NBII – who does what to get the information into the system
 - the technology is standard enough so that applications can work together
 - e.g., have a map of a watershed, click and get information from the area originating from different nodes regardless of boundaries
 - SHOULD BE SEAMLESS
- as a fisheries manager, what do you want to see from aquatic GAP
 - prioritize stream restoration – what should be restored
 - evaluate the impact of proposed projects – changes risks
 - essential fish habitat quantification
 - what are the needs at different life stages
 - integrate fisheries regulations and/or management strategies into aquatic GAP
 - how do these regulations and strategies influence habitat
 - how does terrestrial GAP differ from aquatic GAP

- links with EPA impaired watershed data (TMDL) and bring into management layer
- can you take aquatic GAP and go backward to say what should be there
 - use natural systems as references
- incorporate NAWQA data
- develop relationships with EPA, etc. so you can share data
- have uniform aquatic GAP projects and/or products
- parting comments to FAR
 - why come to FAR over Google
 - help people with specific issues by framing the information
 - give users the data in a context – eventually in a manipulated format (e.g., using modeling tools)
 - NEED TO GET USERS EXCITED ABOUT THE NODES and what they are doing so that they will use the information, products, etc.

Thursday, June 24

International Activities

Introduction

Bonnie Carroll

Information International Associates

Inter-American Biodiversity Information Network and World Bank Activities

Richard Huber, Organization of American States

Doug Graham, World Bank

Pacific Basin Information Facility and its Relationship with the NBII Program

Mark Fornwall

NBII Program

Bonnie Carroll: To give you some context of the key NBII staff resources for the International Program, I've been working with the NBII international program since 1996, the early days. Bobbie Bauldock has been the NBII international program manager and has worked with a lot of the international programs; Andrea Grosse has an operational lead in a lot of the programs now.

I'm going to give you a broad overview of NBII in its international context. Next you'll look at two case studies, two regional initiatives, one of which is rather mature at this point (the Inter-American Initiative). Then we will look at one that has had the benefit of some of the lessons learned from the Inter-American to address issues of the Pacific Basin. So following me we'll have a duet by Richard Huber and Doug Graham. Richard is at the Organization of American States (OAS). He's been there for ten years and he was at the World Bank working with Doug before that. His focus is on sustainable development and environmental issues. He spent five years before joining these

international organizations helping countries in South America establish national park programs. He has his master's in forest science.

Doug Graham is a biodiversity specialist at the World Bank. He's been pulled into the information world and we appreciate that. He's been with the environmental group of the World Bank for twelve years. He primarily works on biodiversity projects in Latin America. For several years he's been working on environmental information networks in Argentina, Columbia, Brazil, Nicaragua, and, of course, IABIN, which he will be talking about today. He has his NSC from the University of Quebec in Montreal.

Mark Fornwall will then talk about the Pacific Basin Information Forum (PBIF). He joined the USGS in 1997. I knew Mark for thirteen years before that when we both worked at the Department of Energy. He's currently the manager for the NBII Pacific Basin Information Node and a member of the NBII steering committee. He is one of the leading developers for PBIF and has his Ph.D. in aquatic ecology.

Let's turn to the NBII in the international context. Here's a picture you're going to see more than once in different guises. Universities, national laboratories, and all kinds of organizations produce biodiversity data. Then the NBII was established as a kind of a top-down initiation program office. With the PCAST report, these individual initiatives began to coordinate into regional and thematic initiatives.

All of these things, from the local level through the regional and thematic levels, build up into what we have as our National Biological Information Infrastructure. Other countries have similar programs. Each country does it differently, but they all focus on how, at the national level, can they get biodiversity resource information available for decision-making? We see this for instance in Costa Rica, Canada, Australia, and India. India is an interesting case because the person leading their development spent a Fulbright fellowship partial year with the NBII, so many NBII concepts have been incorporated in the Indian experience.

So we have these national systems, and we also see nations organized regionally. That's the focus of the two talks.

But we also have the global context. Just as the NBII started globally and then realized it has to be both top-down and bottoms-up, we have global initiatives. We have the Global Biodiversity Information Facility; the Convention on Biological Diversity Clearing-House Mechanism; the Man in the Biosphere program; GEO, which is a new initiative that is 50 countries and 27 international organizations looking at earth observation and different systems for earth observation; and World Data Center on Biodiversity and Ecology (if you want to know more about it, Jack Hill is the person to talk to).

The overall goal is everybody working toward interoperability — nobody wanting all the data at the monolithic edifice complex we used to have; rather, it has to be a distributed system.

What does the U.S. contribute in this international context? We have tools and standards. It's very important for two reasons: one is that we have legacy investments in these tools, so we like to see tools and standards that we use being accepted by the rest of the world. The other is that we want to share; we have these things and we're very willing to share and leverage our resources. Clearly we have technical experts in the information side, in the computing side as well as the biology side. The NBII under Gladys's leadership has been working very hard to develop the biodiversity informatics community. We participate in many working groups, both as members and as support. We also have best practices to share.

We also have leadership to share. Gladys, for instance, is the chairman of IABIN and has been since the chair was established. At GBIF we have the U.S. node. Also, the world data center -- the NBII is designated as a world data center by the International Council of Science.

Why do we do this? Because biodiversity doesn't have national borders, so you have to share it. Nobody has the corner on the market on the information, and a lot of the information is in the developed world. Of course, it's also vital that we learn about biodiversity in the developing world. When the various international organizations are created, they have a lot of the same principles; e.g., today everything is Internet-based, there are issues of intellectual property, and there's a general sense that data stay with the creator because that's where the expertise exists.

But the organizations also vary, and they do so by types of information and geographical extent, and this is good because you can focus on specific things. But, again, every one of these organizations has people and needs to make sure they're talking to each other and all going in the same direction, as in metadata standards.

So you have GBIF, which geographically extends very broadly, but in types of information, focuses only on taxonomic names and specimens, which is very narrow. You have IABIN, which has less geographic extent, but is really looking at many more kinds of information. You have the the Biosafety Clearinghouse, which is part of the convention, and is very narrow in its look at biosafety but broad in its reach. And you have the NBII, which is very broad in its content reach and geographically focused on United States resources and requirements. Altogether you're working toward a global world where all these systems interoperate. We have a lot of bilateral cooperation here with other countries where we do things one on one. We have a lot of regional relationships we'll talk about, too. And we have a lot of worldwide organizations, such as GBIF. NATO is another example of NBII international efforts, and an interesting one we can talk about more afterward if you like. Gladys and Tom Hermann have been active in supporting NATO information initiatives.

So there are strategic international opportunities: we want to capitalize on the strengths; promulgate and develop standards; facilitate global access to U.S. data and U.S. access to global data; and fold in the USGS role as both a science and information agency where the information makes the science useful. The bottom line? To fulfill international commitments the U.S. government has made. That gives you a sense of the context.

Richard Huber: Our talk is in four parts: I'll do the first two. Then Doug will talk about the structure and function of the Inter-American Biodiversity Information Network (IABIN). Finally, he will address the IABIN GBIF project called "Building IABIN."

Here's our hemisphere. This is a system built by nature, sort of. But there are at least four or five major systems out there right now that attempt to capture biodiversity information of our hemisphere, so we need to begin to have some sort of standardization across the systems and the analysis.

Some other very good work that's been done is the Conservation International Hot Spots Program. We'll go quickly through those different hot spots just to show you the importance of the Americas hemisphere. The most important and diverse of all hot spots in the most diverse ecosystem on Earth -- the tropical Andes. It is the area from Venezuela, to Colombia, Ecuador, Peru, the eastern slope of the Andes from the snow-capped peaks down to the hot, steamy jungles of the Amazon. It's considered the most diverse of all ecosystems and a hot spot under threat. The Caribbean has the highest concentration of endemics, as you'd expect from all of the geography and all of the isolationism. The Atlantic forest region of Brazil is down to 10 percent of its original extent, so it's highly threatened.

Meso-America, the land between Central and South America, has 8 percent of the world's biodiversity in less than 1 percent of the land area. This area is also important to the indigenous peoples.

Central Chile has lost unique plants and animals.

But very little of the information just presented to you is actually on the Net. Big NGOs have invested very little money in actually getting significant work and resources onto the Web. We'll hopefully work with them to encourage them to move information onto the Web.

Here you can see done by the World Wildlife Fund and the World Bank . . . world terrestrial eco-agents in the neotropical realm, which is also published in Spanish. I have a book in my library, and I can refer to it, as I do all the time. I have a map on my wall. But this information for the most part is not available digitally on the Web. So all of these major NGOs need to begin to refocus on getting significant management skills and data and research data on the Web.

Here is a list you're probably quite used to which shows indigenous peoples and subsistence consumers and sustainable users — people in buffer zone communities. Significant indigenous peoples live in buffer zones, within indigenous reserves; that is a very key clientele for us, as are the subsistence consumers -- the poor people living on buffer zone communities in and around protected areas.

We did a survey, which Doug is going to speak about, trying to find out the number of specimen collections in museums, information at NGOs, relative buffer areas. In fact,

there's a tremendous amount of information: Mexico and Argentina, for instance, have among the top ten floral collections, but very little of this information is digitized. We're hoping to help them get this information digitized.

Intellectual property is key to us as well. You'll notice that there's been a huge increase in 1990 to 1999 in intellectual property cases (not just biodiversity related). And you can notice that this is fisheries collection trends of the American Museum of Natural History, tremendous collecting going on in the 50s, 60s, 70s, and 80s, and then all of a sudden what happened? Not what you'd expect. It's the Convention on Biological Diversity in 1992, which those countries ratified. What that did was to create a huge consciousness about these issues. As a result, they recoiled from the current situation and became very concerned about bio-piracy. It's made it difficult for people who used to go to places like Venezuela and Brazil annually to do collections. Many of them have stopped doing it. This is a big issue for IABIN and is getting beyond the bio-piracy issue.

What is the demand for this biodiversity information? We did some work on that: when we were designing the IABIN budget to make sure we were gearing the different types of united networks that we need to market to the demand, to the users. The technology is advancing very quickly up here in the North and in the South; \$200-300 worth of equipment may be more than a small museum can afford. So we have to get some of that technology into their hands so we can better manage biodiversity information. There are extensive collections of knowledge in the developing countries.

And also, again, there's the real-time sort of uplink of personal experience and field notes on research on the Web. Now scientists studying at schools, some who are doing similar studies, will talk more easily and begin to share information. They wouldn't have known necessarily they were studying similar things unless there was some sort of e-mail.

Two things about this: Species 2000 is trying to get the 1.7 million species in the world into this standardized nomenclature, as well as species information about them. We need to jumpstart that and get the identification of new species online as quickly as possible.

We're doing well in the Americas relative to the number of protected areas. There are over 400 million hectares of protected areas in the Caribbean and South America. As I mentioned, most of the countries have at least 10 percent of their country protected in the protected-areas programs, with Bolivia being around 20 percent.

The whole issue of metadata versus data is something that's creating a pretty big problem that has a solution. When I went to New York Botanic Garden to get metadata online, I was struck by the related question of "is that metadata or is that data?" It's a very important issue. This also reaches to the question of databases that are centralized versus decentralized.

One of the things we did was look at the best data providers. It's a challenge to find out where we are now but, hopefully, one day in the tropics you'll be able to type in some questions about deforestation rates and you can get maps of 1950 versus satellite imagery from the last time a satellite went over. You'll look at resource value loss and

deforestation at the time. You can begin to do an in-the-field analysis, which would help you locate and learn more about the endangered species you're looking for. So this is the kind of thing that I hope will happen. Technology is moving so fast, but we need to get it in the hands of users.

Doug Graham: Richard has given you the background of some important issues in international informatics. I'd like to just give you a brief outline of where we are with the Inter-American Biodiversity Information Network (IABIN).

IABIN's central theme is to provide an interoperable networking information infrastructure, standards and protocols, and the biodiversity information content required by the countries of the Americas to improve decision-making, particularly for issues at the interface of human development and biodiversity conservation. IABIN is developing an Internet-based platform to give access to scientifically credible biodiversity information currently scattered throughout the world.

I don't think you'll see much of a difference between this goal and the goal that NBII has. Perhaps in Latin America there's a little more emphasis on the importance to human development.

IABIN developed as a proposal of the countries of the Americas. It came out of the Summit of the Americas in Bolivia in 1996. It's been moving along slowly and then they came back to ask for help in getting funding. That's what we've been doing for the last two years, preparing a GEF proposal. As part of it, we took about a year of intense work preparing the project and proposal. We did carry out an online survey that was filled out by several hundred institutions. It gave us a really good feel for what was out there in Latin America — what holdings, what standards were being used, what were the expectations from this kind of network. All these results are online and all of the subregional reports we did.

These are examples of major data holdings in Latin America. In Bolivia there are hundreds and we're in contact with most of them. NGOs, governments, museums — there's a very broad swath of potential participants. It's similar in Central America. It's not just the NBII and Canada that have good networks up and running. Not all countries in Latin America have environmental information or biodiversity information networks; but some of them do, and some of them are really top-notch.

We have a Net-equipped Web site, iabin.net. There's not a tremendous amount of information available through there yet, or tools. But that's the platform that will be the delivery mechanism for the next five years as the IABIN takes off. It's in English, Spanish, and Portuguese.

Through a gracious partnership we have with the NBII, IABIN is and will essentially appropriate a lot of the tools that NBII has talked about, one of which is BioBot. I would expect over the next few years, as we define the use of this tool through IABIN, it will be essentially a transparent process. Users will go onto the Spanish part of IABIN and use

BioBot, but they won't realize they've been transferred to an NBII server. It will be truly an IABINized version of major tools developed here in the United States. And at the same time, we're going to contribute a lot of resources to the development and improvement of BioBot, as we have already, through the development of multilingual interfaces and the development of content.

Just an example that Richard looked up for me: he did a search for "wolf" through BioBot and got 253 hits in the metadata catalog. Then he did a search for "spectacle bear," which is probably one of the best known, and most important endangered species in the Americas and an extremely important species in the Andean tropical forests, and got one hit. The point being is that resources are out there that are easily searchable right now. The challenge is to get them up on the Web in the next few years. As part of the preparation process of the project we've actually hired a company that worked hand in hand with the NBII in improving the BioBot interface. We're putting about a thousand resources online of Spanish- and Portuguese-language biodiversity resources, so in a short consultancy we're starting to make a contribution. But over the next few years our intention is that all of the countries are going to be feeding into an IABIN catalog. But it's going to be affiliated, or perhaps running in the background it will be one and the same with the NBII catalog. So in addition to providing access to a lot of resources within Latin America, the information is also going to be available to anybody coming through the NBII from the states.

I think we have the same understanding of how these initiatives find their niches at different geographic levels, with IABIN at the regional level. We also have partners at the global level, which is very important to the philosophy and development of IABIN. On the one hand, GBIF, the Global Biodiversity Information Facility, is taking the lead worldwide on defining the standards and protocols for biodiversity information. Our intention is to become an implementing arm of GBIF in the Americas. We have a memorandum of understanding with them. We're planning to work very closely not to be developing conflicting standards and protocols, but really to be assisting GBIF in implementing its mandate in the Americas.

The other key global mission for us is the Clearing-House Mechanism (CHM), which is mandated by the Convention on Biological Diversity and signed by most of the countries in the world. The CHM has a global mandate to do a lot of things, such as facilitating information transfer to the developing countries. They also have responsibility for developing standards and protocols for that information. Particularly because the principal funding for IABIN comes through the GEF, the Global Environment Fund, it's very important to us to ensure there are clear links to the CHM. So again, we have a memorandum of understanding, which has been facilitated by Gladys Cotter, and we intend to work with her over the next few years.

I should add, IABIN is not going to create country-based nodes; it's not our intention, so it's going to be different from the NBII, which is setting up formal nodes across the United States. IABIN is more of a network that is going to promote standards and protocols between participating institutions, which could be governments or museums or

NGOs. I think we would be more facilitating the development of GBIF nodes or the development of CHM nodes.

Institutionally, one of the key ways that IABIN works is through IABIN focal points. Each government has named one focal point, which represents the country, and they come together once a year in an IABIN council. We've had very good participation in every country and this is the decision-making body for IABIN. In the period between councils there is an IABIN executive committee, which is composed of nine countries. Gladys, in addition to her key role in NBII, is de facto playing a key role right now politically within IABIN, as the current chair of IABIN.

A few months ago, the IABIN executive committee chose the Secretariat of IABIN and created a physical presence in one place, the City of Knowledge in Panama City, Panama. It's a former U.S. military base. When it was turned back over to Panama after the canal was returned, they had to find something to do with it. It's a huge area, 300 buildings, and the Panamanian government has converted this into a center for development and learning. It's a tremendous initiative. So IABIN will be hosted at the City of Knowledge, with a lot of similar initiatives. So there's room for a lot of synergies there.

In the next month, we're going to hire three people: an overall director, a data content manager, and a network specialist, someone specializing in interoperability issues. So there's going to be a core staff.

We have now finished the process of looking for funding from GEF. The World Bank's Board approved a \$6 million grant to OAS, the executing agency of the grant. IABIN will receive \$6 million from the GEF towards a \$35 million, 5-year implementation project. For the rest of my talk, I'm going to talk briefly about what we're doing for this project. It essentially will define what the network is going to evolve into.

We have in-kind co-financing from different organizations in addition to the grant money, so we're looking at a large reserve of money and resources to move forward.

The countries themselves at the Council meeting chose that the way they're going to move forward with IABIN is to focus resources in six key areas: specimens, species, ecosystems, protected areas, pollinators, and invasive species. The intention would be to hire a lead coordinating institution within each of these thematic networks. The idea is to bring together the major players throughout the Americas and throughout the world, reestablishing the standards and protocols that would allow more interoperability of different systems in the next few years. For each area you're going to hire elite organizations, and their job is going to be getting together people like many of the people in this room. Certainly the NBII is going to be participating in all of them.

We're not going to create new standards or protocols. Our role is to choose the best ones out there and to promote their use in the Americas.

I should mention that the reason the OAS is involved in this is that countries chose it as the executor and recipient of the monies. You need someone to actually receive the money and spend it, so the OAS is implementing on behalf of the countries.

We do want to particularly thank key people from the NBII: Gladys Cotter, Bobbie Bauldock, Mike Frame, Bonnie Carroll, and Andrea Grosse. They've all played key roles in preparing the project in the last few years and have been big supporters of IABIN and will continue to do so.

I'm going to finish up with a few thoughts on what this means to some of you, to people in the U.S., people at the different NBII nodes. I was going to offer some thoughts on why this is important to you, but Bonnie presented this better than I could. Many of the points have obviously been made in other presentations, that biodiversity is a global resource certainly, and a spiritual resource, and that biodiversity does not stop at the U.S. border, the south or the north.

I tried to make the point earlier that you have a lot to learn from counterparts in other institutions in Latin America. There's a lot of amazing work being done in Mexico, Columbia, Brazil — some really tremendous work in informatics. I think the NBII knows that it has a lot to learn from work being done elsewhere in the Americas. In addition, important to IABIN, is also allowing greater access to data. I don't think the U.S. can do a lot of the things it wants to do in terms of extending biodiversity without being able to access information from Central America, Mexico, Canada, and South America. So I think the theme of allowing greater interoperability of data across administrative boundaries, is not only interesting to you. It's indispensable.

So with those thoughts in mind, what would we still be looking for from U.S. participants? Not money, really. I think we are looking for new partnerships and commitments from NBII nodes and U.S. institutions to participate in the initiative; to attend our meetings; and to play a role in providing assistance, ideas, and tools. Please remember it's not a one-way street — a lot of this stuff will be coming back.

The last point is that there is a listserv that's maintained; it's pretty low volume and not overwhelming. For anybody interested in following IABIN as it develops over the next year, I recommend subscribing to it. It's run out of the USGS and you can learn how to subscribe to it on the IABIN Web site. Thank you very much.

Mark Fornwall: I'm here to talk about the Pacific Biodiversity Information Forum. Before I get started, I'd like to talk about PBIN, what it's doing, and its relationship to PBIF. PBIN is the Pacific Basin Information Node, an NBII regional node. PBIF, on the other hand, is the Pacific Biodiversity Information Forum. That activity is being developed under the Pacific Science Association, which is a collection of interested countries. Their national academies have gotten together to form the Pacific Science Association and they're forming a regional initiative for the Southwest Pacific called the Pacific Biodiversity Information Forum. We debated the "B" word and the "F" word, and "B" is the most descriptive as far as they're concerned. "Basin" is too big because we're not going to include Russia, Alaska, etc., and "biodiversity" is a bit of a concern, but we

do mean that in the broadest sense of the term to include agriculture and other interests that are tangentially related or not to biodiversity.

What is PBIF? I'll show you a geographic area, and then, discuss why create the node? We're really in the very first stages and I'd like to highlight the great job that the three speakers did before me because all those issues are in the Pacific in spades. We've got poor countries and a lot of the biodiversity. In addition, their definition of conservation may be a little bit different than ours, but I think it will work in the end.

The area roughly within the polygon you can see is PBIF. There are about 147 million square kilometers of ocean between all the land up there. On the islands, which I'll mainly talk about, there are only 800 square kilometers of land, which less than 1/2 of 1 percent of that area. In contrast, the U.S. is 9 million square kilometers. I'll focus mainly on the Pacific Islands.

It's important to consider the social aspects when we work out here. Many of these island countries have been colonies for three or four different nations in the last hundred years, so they're extremely sensitive to developing countries coming in and trying to tell them what to do and how to do their business. So we understand that when we go in, we try to deal with them as someone who can work with them, side by side to make this happen.

The last thing I want to say by way of introduction is, you have the richest nation in the world involved in PBIF, meaning the U.S., and Kiribas, one of the poorest nations on earth (they're an island nation in the Pacific). So it has to cover a wide range of interested people and diverse needs.

In starting up PBIN, we recognized that, not only would we worry about the state of Hawaii, but we also have U.S. territories up here to be concerned about. The way the islands work, there's a lot of interaction socially and in terms of biodiversity. At PBIN we're concerned about reaching out to these other nations and working with them. So it fit in with PBIN's vision. Where I hear about biodiversity in the Americas, I think the Pacific Islands share the same issues. They've got tons of endemic species, they're really under stress because populations are growing, and there's nowhere for people to go. The island of Kiribas, for example, moved four or five families to a small atoll to try to get it established so folks could live there and not put so much pressure on some of the main islands. In ten years they ran out of water and had to move back. So these are tiny, tiny land areas where people have to live with very meager means.

There's a crying need out here for folks to get information to try to manage the biodiversity and they're struggling doing it. So when we set out to try to establish PBIF, we wanted it to be a collaborative approach. We sought consensus and we sought to help in resolving problems, and become an integral part of their system. That's what I hope you'll see in the steps that we've taken so far.

We started out by engaging people. There was a meeting on Maui in June 2002 to try to organize the effort; then there was a meeting in Tsukuba, Japan, in October 2003, where I think we really consolidated the effort and got people to move forward. We invited

handpicked people to the Maui meeting; not people to speak for the country, but people who had a pretty good idea of how the country might react to the establishment of PBIF. We sought their ideas: Is this feasible? Should we do this? What's the first step? Everyone agreed there was an overwhelming acceptance. We even developed a vision at that meeting. They identified the next date and agreed to plan a large workshop to include everyone in the area to test out the vision and see how we could move forward.

We focused on decision-making in the Pacific, supported by the improved usefulness of biodiversity information resources from the Pacific region. "Forum" is the key word because they wanted a way for Pacific countries and people trying to manage biodiversity in the Pacific to get together to share data, talk, exchange ideas, and "forum" was a broad term. We didn't want "facility" or "information system" or something specific.

At the first meeting we had over 40 attendees from around the region. The reason we picked Tsukuba is that it was at a joint meeting of a local taxonomy initiative for Asia, Oceania, and GBIF, so a lot of the folks were already coming there.

The mission is to develop a complete, scientifically sound, and electronically accessible Pacific biological knowledge base and make it widely available to local, national, regional and global users for decision-making. It's going to be a challenge for PBIF to develop an information system to serve people who are going to need other access, not necessarily the Internet, which we commonly use.

Some of the projects we chose at that workshop were pretty interesting, such as: biological survey for the Pacific, celebration of biological inventorying, in-country surveys, training and developing taxonomists. These countries want to know what is in the country. A lot of the work that's been done in their countries has been from other countries and done years ago.

They want to train taxonomists. Taxonomy was number one on their radar screen. Then they wanted to bring in the spatial aspects so they could look up where this stuff is located. Invasive species also came up as an important topic.

Right now we're in the process of linking to existing data and information. We'll be developing bibliographies of the area, mainly related to species and the species checklist and supporting the checklist, which is the third item. That will be a good start; at least folks will then begin to have an idea about which species people think are in their countries. Those things can be validated.

Then we will look at implementing much more complex Internet services, such as mapping services and taxonomic services. We're going to start with those basic things first. Plus, outreach and networking has to go on all the time. We want to review progress after one year to see where we are — is it working and what adjustments do we need to make?

We had a meeting in Oaxaca, Mexico, in May 2004; again, it was associated with the GBIF meeting there. We reviewed PBIF progress and were pretty happy with it. But one of the things I had trouble with is the fact that we're beginning to build the Web site at PBIN, and I needed some interim operational procedures.

We're developing an operational framework, which we'll look at in the next six months or so. One of the things I noticed in those projects is that there wasn't much content or capacity beyond the floor of the network itself. So, we're going to partner with the GTI initiative at the GBIF meeting in Wellington, New Zealand, in October 2004. We want the system to be science-based. We're looking at a sufficient organization to facilitate decision-making, cooperation, product development, and taxonomic information.

As far as governmental organizations, I think that would come in a bit later. We're not excluding governments, we just thought it would be in the negotiation process a long time and we want to get the system up and running. There are a lot of institutions right now that want to be engaged.

Ongoing projects include: the Cook Islands database, which you can view on the Web; and a partnership with the South Pacific Regional Environment program, which is an intergovernmental organization of Pacific islands. They're giving us their data to put out because they don't have the means to do so right now.

At the workshop in Wellington, we're going to use one day to define projects for PBIF to seek grants from GBIF. We're also going to look at both taxonomic capacity and information capacity. We talk about this on the Web site.

Thank you.

Wildlife Disease Information Node

Vivian Nolan

NBII Program Office

The Wildlife Disease Information Node (WDIN) session, presented by the Node Manager, focused on the current major node projects. A brief background of this prototype node was first provided, including its location and its funding history since it began in 2002. The major projects presented in this session included: the node Web site, disease surveillance maps from EPIZOO data, mortality reporting system, Chronic Wasting Disease (CWD) information resource, and the National CWD data clearinghouse.

WDIN Web site

- The WDIN Web site has gone through major revisions since 2002.
- Information is divided by thematic areas: wildlife diseases, human health, CWD, related organizations and videos, disease surveillance maps, and the WildPro Information Network. See <<http://wildlifedisease.nbii.gov>>.

- Wildlife disease information is currently limited to a selected number of diseases, but will expand in the future to be more inclusive.
- Human health section currently includes information on Hantavirus, sylvatic plague, and West Nile virus (WNV), but will also be expanded in the future.
- Digital videos currently include: Blood Collection from Birds, Collecting Biological Samples from Live Animals, CWD of Deer and Elk, and Necropsy of Wild Ungulates. More will be added with FY04 funding. The section on digital photographs is under development, and will contain a collection of public domain photographs on a wide variety of wildlife disease topics that can be viewed and downloaded.
- WildPro is an electronic encyclopedia and library providing information on the health and management of captive and free-ranging wild animals, and emerging infectious diseases. Data is fully referenced and is provided in modules that include: Foot and Mouth Disease (FMD, WNV, and CWD).

Disease Surveillance Maps – EPIZOO Data

EPIZOO data:

- Collected by members of the Field Investigations Team at the USGS National Wildlife Health Center (NWHC)
- Summarizes information on mortality events in wildlife.
- Tracks die-offs throughout the U.S. and its territories; covering migratory birds, endangered species, amphibians and other wildlife species.
- Data include incident, dates, species involved, total dead, and diagnostic information.
- Includes data from 1975. Data are entered & updated regularly as new information becomes available.
- EPIZOO data is made available through the WDIN's website disease surveillance mapping applications.

Disease Surveillance Maps <<http://wildlivedisease.nhii.gov/Mapping/maps.html>>:

- 3 types of queries available for EPIZOO data: simple query, advanced query, and multi query.
- Query selections can be made by selecting a particular type of diagnoses (ie, duck plague, avian cholera, etc.), geographic location, and time scale.
- The available reports produced from the queries provide: the diagnosis, species name, onset and cessation date of outbreak, county and state, and whether final mortality is estimated number.
- A live demo was presented to the audience using duck plague and avian botulism as an example for advanced and multi queries.

Mortality Reporting System

- Currently password protected for partners.
- Can be used for real-time wildlife surveillance activities.
- Individuals can enter information via the Web to report morbidity or mortality events of wildlife, including exact coordinates where critter(s) was found, date found,

approximate age, body condition of wildlife, environmental conditions, estimated mortality, and point of contact.

- Online reports will then be able to be generated that provides the requested information.

Chronic Wasting Disease Information Resource

- CWD has been the major node focus since it has been a priority concern for states and because of earmarked CWD information management funding for FY04.
- A number of resources already available through the WDIN website, including scientific, technical, and general interest CWD information for posting on node Web site from the Chronic Wasting Disease Alliance (a collaborative project involving numerous organizations whose mission is to promote responsible and accurate communications regarding CWD, and to support strategies that effectively control CWD to minimize its impact on wild, free-ranging deer and elk populations).
- Overview given of CWD:
 - One of a group of diseases known as the transmissible spongiform encephalopathy diseases (TSEs)
 - Affects both captive and wild cervids in North America
 - It is a contagious, fatal neurological disease
 - Characterized by loss of body condition, behavioral abnormalities
 - Similar to mad cow disease in cattle, scrapie in sheep, and Creutzfeldt-Jakob disease of humans.
- Overview presented of why CWD is one of highest profile issues facing state fish and wildlife agencies today.
 - Significant losses among captive and wild cervid populations and associated eradication programs.
 - Where it occurs, CWD may (and has already) alter the management of wild deer and elk populations.
 - Public and agency concerns and perceptions about human health risks associated with all TSE's may erode hunters confidence and their willingness to hunt in areas where CWD occurs.
 - Revenue impact from loss of hunting and associated activities: Economic losses: estimate \$100B/yr impact on U.S. economy (source: Rocky Mountain News, October 23, 2003; The Denver Post, October 24, 2003).
- Map of where CWD has been found in North America to-date: (source: NWHC <http://www.nwhc.usgs.gov/research/chronic_wasting/chronic_wasting_map.html>).

National Chronic Wasting Disease Data Clearinghouse (CWDD)

Pre-CWD data clearinghouse efforts were presented first:

- The National CWD Management and Implementation Interagency 2002 Task Force Plans contained sections on: Research, Surveillance, Disease Management, Diagnostics, Communications, and Scientific & Technical Information Dissemination.

- Under this last section, the NBII Wildlife Disease Information Node was endorsed as being the organization to develop the central repository for the CWD information.
- National CWD Plans' Blueprint:
 - Provide access to common scientific and technical information
 - Integrate data from State and Federal agencies, tribal groups, and others into WDIN
 - Create data standards that will allow interoperability with existing CWD data sets
 - Provide near real-time access to CWD data and other critical information
- National CWD Data Standards Meeting
 - Hosted by Conservation Management Institute through a multi-state conservation grant.
 - Approximately 46 participants:
 - 30 states represented
 - 3 Canadian representatives
 - Federal government: USGS, FWS, NPS, USDA
 - 1 tribal representative
 - National Biological Information Infrastructure
 - Not-for-profit organizations
 - Meeting objectives:
 - Learn how state fish and wildlife agencies collect, handle, and report CWD data
 - Identify what are restrictions on sharing and reporting data
 - Establish data standards (types of data) and formats needed by all parties for monitoring and control efforts
 - Pre-meeting Survey to collect information
 - Developed by CMI, IAFWA, Chair for National Implementation Team, NBII
 - Sent to states, tribal organizations, Canadian provinces
 - Report developed summarizing information submitted
 - Summary survey report available to participants before the meeting
 - Total # of responses: 53 (USA=48, Canada = 5)
 - Format of CWD data standards meeting
 - 2-day meeting, June 2003, Madison, WI
 - 4 breakout sessions / 4 groups:
 - Identification of basic data standard
 - Formatting the standard (making data comparable)
 - Addressing concerns for protection of critical data

- Overcoming obstacles – information sharing solutions
- Outcome of CWD data standards meeting
 - Discussed methods for data transfer
 - Established a set of standards and formats for a national CWD Data Clearinghouse
 - ensure data comparability
 - allow for interoperable systems

National CWD Data Clearinghouse (CWDDC)

- Builds on collaborative efforts established at the CWD data standards meeting & CWD National Plans
- First major step: identifying critical drivers, functional and technical requirements
- Build a prototype first
- Being developed in partnership between NBII and USGS NWHC
- Critical drivers that were identified through the National CWD Plans and CWD data standards meeting included:
 - Integrate CWD data from State and Federal agencies, Tribal and land managers, and other sources into a centrally located CWDDC
 - Minimize requirements for data reprocessing at provider level to support submission of data to the CWDDC
 - Establish a robust database that can integrate testing results as well as research, monitoring, and surveillance data from various sources into a common database schema
 - Deploy an Internet-based system that supports interoperability from geographically distributed sites
 - Provide mechanisms by which data can be queried, extracted, analyzed, and reported to support making scientific information accessible to all parties dealing with CWD issues
 - System needs to be password protected for partners.
 - Separate accessibility for public for general information.
- CWDDC Proposed Concept of Operations
 - Through various integration mechanisms, CWD data providers provide CWD datasets to the common clearinghouse
 - CWD data users interact w/ the CWDDC through various access mechanisms (ie, security profile) to obtain access to services and data
 - CWDDC provides a set of capabilities that support the sharing of CWDDC data between providers and users
 - System administrator monitors and manages the technical operations
 - Program administrator monitors and manages end-to-end admin operations.
- Data for CWDDC Prototype Efforts
 - 3 states provided limited CWD records: Wisconsin, Tennessee, and Nebraska
 - USDA/APHIS expressed an interest in providing data in the future
 - Maryland agreed to be the test state for data entry purposes

- CWDDC Prototype Beta Testing Efforts
 - Virtual Workshop: month of August 2004 included the following participants:
 - State data providers and other state agencies
 - U.S. Department of Agriculture (USDA)
 - Southeastern Cooperative Wildlife Disease Study (SCWDS)
 - International Association of Fish and Wildlife Agencies (IAFWA)
 - USGS National Wildlife Health Center (NWHC)
 - National Biological Information Infrastructure (NBII)
 - On-going testing for one week post workshop for Virtual Workshop participants
 - Compile and assess beta-testing feedback and develop second generation prototype to demonstrate at IAFWA annual conference.
- CWDDC Prototype Demonstration at 2004 IAFWA Annual Conference
 - IAFWA Committee Meetings
 - Fish and Wildlife Health Committee
 - Wildlife Resources Policy Committee
 - 2-hour Workshop to demonstrate functionality of the system
 - Computer lab (hands-on) at NBII Exhibit
 - Participants able to:
 - Test permissions and security aspects
 - View detailed and summary data options
 - Conduct data entry (Maryland state only)
 - Conduct pre-defined queries
 - View reports and maps
 - Log in screen to capture name and contact info for each participant, and any feedback
 - Distinguish between verified vs non-verified data
 - User feedback will also be used to develop CWDDC production system.

Friday, June 25

Invasive Species Focus Session

Annie Simpson

Invasive Species Information Node

These are the ideas generated by participants in the Invasive Species breakout session at Big Sky on the morning of June 25. There were many great points made, and we hope to implement in the short term about one-third of these bullets. If you could not attend the Big Sky session, or if you have additional ideas for any of these areas, please e-mail them to Annie Simpson at <asimpson@usgs.gov>.

FY05 strategic plan for Invasive Species Information Node (ISIN)

- General NBII strategic plan will be done
- Need to dedicate resources to create an ISIN plan

- Build on applicable portions of other nodes' plans
- Discuss and take lessons learned from Elizabeth (Bird Conservation) and Doug (Fisheries and Aquatic Resources), especially related to issues and opportunities
- ISIN should participate in regional node planning as well
- ISIN's plan will affect regional plans, too
- Be sure to include input from the outside as well, especially GISIN
- Build better ties with USDA and other agricultural invasive species organizations

Updating of list of species of concern

- The original was partially generated by input from regional nodes
- Make another call for input from all nodes
- Get input from outside; e.g., USDA
- Maintain all references as to who suggested the species and why
- a small subset of the USDA pest management database is being made available by PBIN, as a pilot project

Tell ITIS what taxonomic groups are invasively important

- Consult with external experts from expertise databases
- Include toxic algae
- Importance from ecological perspective and pathogenic perspective (difficult to find expertise in pathogens)
- Consult with nodes; done 30 July in email to cross-node working group
- Take agro-terrorism into account (funding and activity in academia and government is very strong)
- Remember to include taxonomies of biological control agents
- Include taxonomic groups that are vulnerable to genetically modified organisms (GMO's)
- ITIS needs to remember the importance of clearing up hybrid issues

Expertise Database

- Create the experts DB for both identification and rapid assessment (probably two different sets of people)
- Use TRED
- Incorporate some headings from the ESA expertise database too
- Consult with the Union of Concerned Scientists about their database
- Review as many expertise databases as is feasible/workable, but don't start from scratch

Gaps in the Invasive Species Early Detection/Rapid Response (ED/RR) information system

- Ask Dan Simberloff (ask for his review)
- PBIN is experimenting with ways to quickly get information and photos on the Web and to users as soon as a new species is reported
- Concerning Reporting Forms, we should take into account and/or work with the following online systems:

- mortality reporting system in wildlife disease node (Vivian) - about a year old (USGS, NWHC)
- Brown Tree Snake rapid response team (USGS) (Leanne)
- PBIN snake reporting database (Gordon and Robby)--Database completed putting in records from Saipan
- Hawaiian invasive species committee "report a pest" campaign - web site to allow people to report sightings of invasives
- Non-Indigenous Aquatic Species reporting form (Pam)
- Tamarisk reporting form (NIISS/FORT) (Greg)
- National Heritage Programs with reporting forms (Judy)
- DNR's in states may also have reporting forms
- PBIN has a mapping tool consolidating reports from Hawaiian Islands Invasive Species Committees
- Include bird taxa in the ED/RR system, taking into account county data collected by Bruce Peterjohn
- In the ED/RR design, be sure to work with and include the FICMNEW plan developed for plants
- Include invasive diseases in the system, by working with the Wildlife Disease Information Node and their partners
- Include ballast water in the protocols (Union of Concerned Scientists' web site has much info)
- BRD fish lab in Seattle is dealing with ballast water issues (consult with them too)
- Brainstorm on ways to disseminate information once species are detected (to nip them in the bud)
- Determine how to harvest GAP stewardship information and incorporate it
- Talk to Gaye Farris on possible research librarian for jurisdictional/stewardship DB development
- Consult the Environmental Law Institute
- Determine if state jurisdictions can be included in the short term
- Consult with state databases on emergency management of domestic animal diseases including quarantine protocols
- Examine the State DB's that are currently under development for other purposes; they may be able to be queried for the ED/RR system
- Check out State of Tennessee control manual for plants (a best practices DB online at SE EPCC website)
- Link with CDC and state health departments for things like WNV and other diseases and vectors
- Check the structure of CSA's best practices DB and don't start from scratch
- Link to TNC and Canada's Integrated Pest Management site and others for control information
- Determine whether to create a centralized DB only on control or link to existing control/management databases
- Be sensitive to the differences between commercial and government information on control

- Develop an information resource for extension services; link to extension services' information resources
- Partner with and index the weed control teams' information (teams are mainly in the West)
- Consider a Request for Proposals in FY05 to fill in the gaps on the components of the ED/RR system

Outreach/marketing needs to be of prime importance

- Start with schools/universities
- Create a marketing cross node working group
- Create brochures depending on interests and affected habitats
- Provide native species alternatives to invasives (don't just attack the use of non-natives)
- Obtain interviews with media, create press releases
- Talk to strangers about what you do
- Strive to give examples that are pertinent to the audience
- Targets: plant nurseries, boating groups, pet stores, hobbyists, landscaping groups, arborists, related professional organizations, "friends of XX" groups, park volunteers
- Be aware of cultural issues (snakehead eg)
- Work with state invasive species councils that are targeting local organizations
- Discovery Channel, nature channels, nature show spokesman
- Generalized media campaign
- Pursue diplomatic channels (GISIN eg)
- Market NBII with invasives in a way that is good for the NBII (review the list from this perspective)
- Consult with our partnering organizations about their marketing plans... and learn from them